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THE WILSON ORNITHOLOGICAL CLUB

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Named after ALEXANDER WILSON, the first American ornithologist.

President—Maurice Brooks, West Virginia University, Morgantown.

First Vice-President—W. J. Breckenridge, University of Minnesota, Minneapolis.

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THE WILSON BULLETIN

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# THE PRESIDENT'S PAGE

Since this marks the beginning of a new administration in Wilson Club affairs, it would seem appropriate that some accounting of the official family be given. Club members have a right to know what they may expect from their officers, and what are the policies that will be followed.

After a long and devoted period of service to the Club, Olin Sewall Pettingill, Jr. retires as one of your officers. As Secretary, as Vice-President, and as President, he has been untiring in his efforts for the welfare of the organization. Fortunately, through the wise provision of the Constitution which makes all Past-Presidents permanent members of the Executive Council, we shall continue to have the benefit of his experience and leadership.

Walter J. Breckenridge, of the University of Minnesota's Museum of Natural History, assumes the duties of First Vice-President. He has served as an elected member of the Executive Council, and, more recently, as Second Vice-President. Many members will remember the last Minneapolis meeting, for which he had the responsibility as Chairman of the Local Committee on Arrangements. For its Second Vice-President the Club has chosen Burt L. Monroe, of Anchorage, Kentucky, who retires from the Treasurership. During a period of rising costs and financial difficulties, Burt Monroe has handled the fiscal affairs of the Club with great skill and complete devotion.

The Club's Secretary continues to be Harold F. Mayfield, of Toledo, Ohio. He brings to his duties a wide business experience, a thorough training in personnel management, and a spirit of cooperativeness which make his services invaluable. As the new Treasurer, James H. Olsen, of Columbus, Ohio, has been chosen. He, too, has had wide business experience and extensive contacts. He has grown up through the Brooks Bird Club, and is now serving as its President.

David E. Davis, of Johns Hopkins University, has felt that he must retire as Editor of *The Wilson Bulletin*. During his term as Editor, he has had to deal with the perplexing problems of sky-rocketing printing costs, and he has worked untiringly and with great scientific skill. As the new Editor, George Miksch Sutton has been chosen. In addition to his long service to the Club in many capacities, he brings to his new duties an international reputation as artist and writer, and a boundless enthusiasm.

The newly-elected member of the Executive Council is Fred T. Hall, Director of the Davenport (Iowa) Public Museum. He will also serve as Chairman of the Local Committee on Arrangements for the 1951 meeting in Davenport. Members of the Council who continue in office are Richard H. Pough, of the American Museum of Natural History, New York, and William C. Vaughan, of Buffalo. Burt Monroe will continue to represent the Club on the Council of the American Ornithologists' Union, and S. Charles Kendeigh, a Past-President of the Club, will be our representative on the Council of the American Association for the Advancement of Science, of which we are an affiliate. To serve as a member of the Board of Trustees, Aaron Moore Bagg, of Holyoke, Massachusetts, has been named.

According to the retiring Treasurer, we have weathered the worst of our financial stresses, and the Club finds itself in sound fiscal condition. We shall strive to maintain our present membership rates, since members of the Council believe that our low dues are an encouragement to joining for students and other beginners in the field of ornithology.

It will be the policy of the President to bring into the active work of the Club as many as possible young and promising bird students. By tradition, ours has been a *young* organization, in which both professional ornithologists with a genuine liking for field work, and active and enthusiastic amateurs in bird study, can feel at home.

The fine spirit of Club members made manifest at the recent Jackson's Mill meeting is both a promise and a challenge. There is every reason for hoping that the organization can progress toward richer experiences for its individual members, and toward greater service for ornithology. To the realization of this hope your new President pledges his best efforts, and asks the fullest measure of your cooperation.

MAURICE BROOKS

FEMALE GOLDFINCH AT NEST. PHOTOGRAPHED IN BUTLER COUNTY, PENNSYLVANIA, IN AUGUST, 1945, BY HAL H. HARRISON. THE MANY DROPPINGS ON THE RIM ARE CHARACTERISTIC OF GOLDFINCH NESTS TOWARD THE END OF THE FLEDGING PERIOD.

# BREEDING BEHAVIOR OF THE GOLDFINCH

BY ALLEN W. STOKES

THIS paper presents aspects of the breeding behavior of the American Goldfinch (*Spinus tristis*) with emphasis on pair formation, establishment of territories, and breeding success. The study was made on 24 acres of park and marshland in Madison, Wisconsin, during the summers of 1944, 1946, and 1947. The area offered the advantages of high breeding densities and nests placed so low that observation was easy.

The Goldfinch has been the subject of several good nesting studies within the past 20 years. Walkinshaw (1938, 1939) made an intensive study on a 35 acre marsh near Battle Creek, Michigan, supplemented by data collected over a period of 20 years. Drum (1939) studied aspects of territorialism during 2 summers at Douglas Lake, Michigan. Mousley (1930a, 1930b, 1932, 1935) spent entire days at a single nest in southern Quebec making excellent observations on the activities of that single pair, repeating his observations during 2 subsequent summers. The observations of Mousley and Walkinshaw on nest construction, egg-laying, incubation, and care of the young were very thorough, and I have little to add to them. The reader is referred to their studies for these aspects of the nesting cycle. I wish to express my thanks for the guidance of Dr. R. A. McCabe under whose guidance the study was carried out during the first year. This study was financed in part by a University of Wisconsin research fund established in memory of the late Charles W. Bunn and is journal paper number 18, University of Wisconsin Arboretum.

## Study Area

About 16 acres of the area were part of a large peat marsh bordering Lake Wingra in Madison. During the summer, the ground was usually dry and firm. The other 8 acres consisted of lawn, shrubs, and shade trees, chiefly elm (*Ulmus* sp.), red maple (*Acer rubrum* L.), poplar (*Populus* sp.), and willow (*Salix* sp.), and was on higher ground (Figs. 1, 2). With the exception of occasional small box elders (*Acer Negundo* L.) and willows there were no trees on the peat marsh proper. Elderberry (*Sambucus canadensis* L.) was the most abundant shrub, occurring in large clumps, or else as individual plants. Next in order of abundance came red-osier dogwood (*Cornus stolonifera* Michx.), buttonbush (*Cephalanthus occidentalis* L.), and Tartarian honeysuckle (*Lonicera tatarica* L.). Common forbs included Joe-Pye weed (*Eupatorium maculatum* L.), giant sunflower (*Helianthus giganteus* L.), goldenrods (*Solidago* spp.), asters (*Aster* spp.), thistles (*Cirsium* spp.), nettle (*Urtica procera* Muhl.), jewelweed (*Impatiens biflora* Walt.), wild cucumber (*Echinocystis lobata* Michx.), smartweeds (*Polygonum* spp.), swamp milkweed (*Asclepias incarnata* L.), and dodder

(*Cuscuta Gronovii* Willd.). Grasses and sedges covered much of the marsh. All classification of plants is according to Deam (1940).

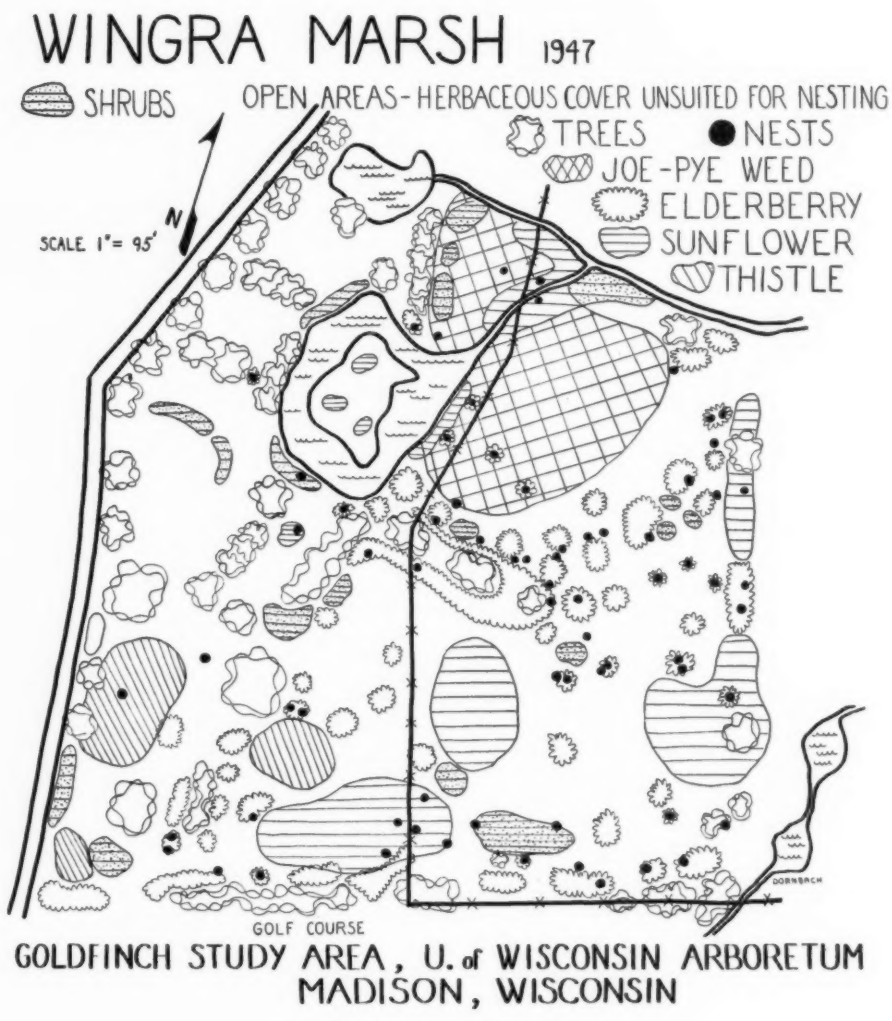


FIG. 1. Goldfinch Study Area—1947

## METHODS

Observations began July 1 in 1944 and 1946. I spent the spring of 1947 in Madison and was able to observe the Goldfinches from the time of their arrival. As soon as the birds came into the study area in late June, I spent many hours watching them from a high tower or several tree lookouts. The area was carefully checked for nests 4 or 5 times throughout the nesting season by searching

all trees, shrubs, and suitable forbs, but with experience most nests were located by observing the behavior of the birds. Of the 240 nests found on the area during the 3 years, 161 were found before egg-laying started; 65 contained eggs; 11 contained young; and in 3 the young had already fledged. In the late fall of 1946, after all leaves had fallen, I found 6 nests I had overlooked (7% of the total). Nests were checked every 2 or 3 days to establish the progress and outcome. In a few cases the interval between observations ran as high as 10 days.

In 1944, 4 females and 1 male were marked with colored celluloid leg bands; in 1946, 16 males and 19 females; and in 1947, 9 males and 30 females, of which 6 males and 10 females were also marked with colored pigeon feathers attached to the rump with cement. Most of these birds were banded during the stages of nest construction or early incubation, and were watched closely to determine breeding behavior and the size of the breeding population. Observations continued each year until all birds had fledged. Approximately 600 hours were spent in the field during the 3 years.

## Pair Formation

Goldfinches were uncommon birds during the winter in the Madison area. Spring migrants did not become conspicuous until May 10 in 1947, the only spring I was in Madison. By May 18 they were among the most common birds around Madison. Only a few days earlier dandelions (*Taraxacum officinale* Weber) had come into bloom like Cadmus' teeth, making golf courses and lawns an almost solid mass of yellow. Goldfinches were feeding in extraordinary numbers on these dandelions, suggesting that possibly their migration kept pace with the blossoming of these flowers, thus ensuring abundant food. Many of these birds were already paired.

It soon became obvious from daily observations on many birds that courtship and pair formation take place while the birds are still in flocks during May and early June, and probably earlier. Establishment of territory on the other hand occurs less than 2 weeks before nest building starts in early July. This is in contrast to most song birds where pair formation follows establishment of territory. Walkinshaw (1938) observed pair formation in Goldfinches to have taken place in late April. I have found no other mention of pair formation in the literature. Although my observations are incomplete, I will present the elements of behavior I associated with pair formation, although they may not necessarily be in their actual chronological order: (1) courtship song, (2) courtship flights, (3) song flights, (4) canary-like or true song.

(1) *Courtship Song.* When Goldfinches first arrived in 1947, I heard several males sing a "courtship song" at intervals of about 5 seconds and lasting for 2 seconds. Its first part was suggestive of the beginning of the song of the Song Sparrow (*Melospiza melodia*) and then it broke into a faster, higher-pitched portion resembling the true Goldfinch song. This courtship song was un-

doubtedly the same as that described by Nice (1939). The only time I ever heard it during the nesting season was on August 14 when a male had lost his mate. At that time it sang every 5 seconds for at least 10 minutes. Hence I think this song is used to attract a mate. It is not a territorial song, as Mrs. Nice correctly deduced, in that it is heard a month or more before territories are established. The fact that I heard it so seldom at Madison suggests that most Goldfinches were paired before arrival.

(2) *Courtship Flight.* Often while birds were feeding in flocks, paying no apparent attention to each other, a male darted out after a female and pursued her in a zig-zag flight, weaving in and out among the trees at break-neck speed and only a few inches behind her. Occasionally the female seemed to be chasing the male, but the action was so fast and the birds so close together that I could not be sure. Almost invariably other males joined the flight until there were as many as 6 males pursuing the same female. This usually ended in a song flight by the males while the female disappeared among the trees or bushes. On several occasions the male rejoined the female that he had chased, so pairing had apparently taken place. I spent about 10 hours watching various flocks at this stage and observed such chases every few minutes, yet never observed any stimulus in the form of posturing or call that might have set off this flight.

(3) *Song Flight.* The song flight is similar to that of the Brown Thrasher (*Toxostoma rufum*) and Yellow-breasted Chat (*Icteria virens*), a hovering, hesitant flight in a perfectly horizontal path, the bird seeming barely able to keep itself aloft. Although this flight is usually in a circular course during the nesting season, it more often is straight or irregular and of shorter duration in the courtship period. During this flight the male invariably sings his typical canary-like song. Just as soon as he stops his song flight, his song stops, and he resumes the typical undulating flight with its accompanying *per-chic-o-ree* note.

(4) *Canary-like Song.* This typical Goldfinch song has defied description, but closely resembles the varied warbling of a canary. It was most often heard from the treetops and only seldom from the tops of small bushes. Singing was most frequent during courtship and before nest building had started. Males sang in flocks even more than while alone. Although I do not know its true rôle, it is certainly associated more with courtship than with territorial establishment.

Records for the occurrence of first song at Madison for the past 4 years have been kept by James Zimmerman. They are: April 19, 1945; April 17, 1946; May 7, 1947; and April 17, 1948. He believes that song may be correlated with sudden availability of abundant food. His dates of first song reflect the fact that 1945, 1946, and 1948 were early years and 1947 late, as to development of vegetation. Onset of song and of nesting in these 4 years do not seem to be related, since 1947 was the earliest nesting season, yet latest for beginning of song.

Birds separated from the flock after pairing but apparently moved freely

without regard to territory. During this post-pairing stage the male was intolerant to other males that approached close to the female. Defense at this time took a variety of forms. Usually the defender merely flew to the intruder's perch, forcing the latter to move off. At other times the defending male flew after the intruder in the same hesitant manner of the song flight, but without singing. More rarely the 2 males became involved in a "tumble fight". Here the males flew at each other, first one above, then the other, like cabbage butterflies but with no actual violence. It often ended with the 2 males making a song flight. These flights were often seen, but were short and related only to the position of the female at that time and not to any territory. Less often the female drove other females from her mate in the same manner as the males.

### Maintenance of the Bond

Once formed, the bond is maintained chiefly by courtship feeding. This occurs from egg-laying through nestling stages. After the first egg has been laid, the female spends much of her time on the nest, getting on and off at frequent intervals. When the male flies overhead she may fly to him, but more often she will extend her head, flutter her wide-spread wings rapidly, and utter a high *chee-chee-chee-chee*. If the male approaches the nest, the female moves up on the rim with bill extended for feeding. In about half the cases the male will come in to feed her, the food consisting of anywhere up to 30 regurgitated seeds. At other times the male may perch in a nearby branch or neighboring bush, making no advances towards the female. But the female is not easily put off; she flies with quivering wings to the male and will even peck at his bill in her efforts to obtain food, at which the male may finally capitulate.

The male does his share in feeding the young. If the female happens to be brooding the young as he comes to the nest, she will again beg for food as described above and be fed. She will then usually feed the young with these same seeds. On 2 occasions I have seen a male feed his mate following nest failure.

I have observed copulation on only 3 occasions. Once the male approached the female as she was begging for food. Within a few seconds he mounted, copulation lasting for only 2 or 3 seconds, during which the female quivered her extended wings. The male then flew off without further ado. In the other 2 cases there seemed to be no prelude to copulation.

### Establishment and Maintenance of Territory

During May and early June, Goldfinches remained on the lawns where food was abundant, and did not come down into the marsh until ready to establish a territory. From the middle of June until the middle of August there was a steady infiltration of birds and establishment of new territories. During July, I never noticed unmated birds in the marsh. In August I observed 3 cases of aggressive males, presumably unmated. Unmated birds may have fed in the

large neutral areas of the marsh, but they certainly did not attempt to intrude on established territories. A flock of 4 unmated Goldfinches, the only ones seen outside the study area, were in an area of poor nesting habitat.

Authors disagree about territorialism of Goldfinches. Walkinshaw (1938) and Nice (1939) found no evidence of conflict between pairs and believed Goldfinches showed a definite sociability in nesting. Drum (1939), on the other hand, found definite territories that were actively defended against all males trying to settle within the territory.

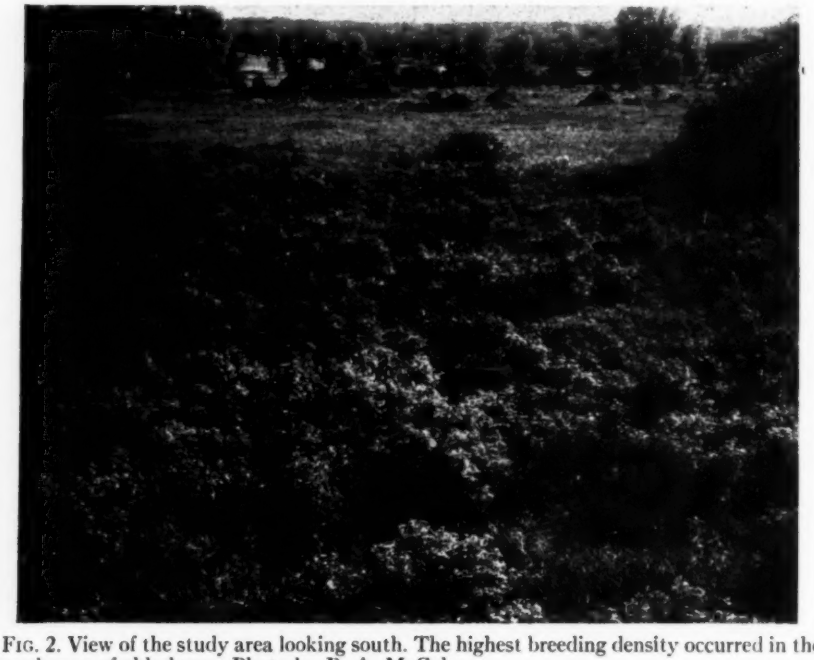

FIG. 2. View of the study area looking south. The highest breeding density occurred in these loose clumps of elderberry. Photo by R. A. McCabe.

At Madison much of the territorial behavior was established by placing a mounted Goldfinch at 3 to 30 feet from the nest sites during all stages of the nesting cycle. This showed that some birds took up their territory 2 weeks before actual nest building, but usually only a day or two. Males attacked the male dummy when it was placed within 10 yards of the nest site, the reaction becoming stronger the closer the dummy was to the nest. Once a male attacked the dummy near the nest of a neighboring pair 10 yards distant. Females attacked both male and female dummies that were placed within 5 yards of the nest, and at this distance attacked more intensively than did the males.

On several occasions both male and female attacked simultaneously while I was still placing the dummy. A vigorous attack consisted of alighting on and pecking at the head of the dummy. At the other extreme the birds merely

called plaintively and flew from perch to perch near the nest. Occasionally, the males made a song flight. When the dummy was left in place for more than a few minutes, the birds soon stopped attacking and perched 5 to 10 yards away. There they usually pecked at their toes, presumably a substitute mechanism. Often the males perched facing the dummy, body erect and motionless. When neither male nor female was present when I placed the dummy, I have on several occasions seen the male flying past overhead. The instant he saw the dummy he swooped down and attacked immediately without alighting. Once a male, unaware of the dummy, was feeding low in some nearby bushes. The instant he noticed it he attacked. In 1946 the dummy was attacked by 10 males and 5 females; in 1947 by 10 males and 17 females. Both males and females attacked the dummy as late as the 10th day of incubation.

Much of the above evidence might be construed as merely defense of nest site and not *prima facie* evidence of territorial defense. But many hours spent in an observation tower and other lookouts gave additional evidence. Males on the territory commonly perched quietly and motionless on top of tall shrubs, often a dead branch. Intruding males might take up a similar position within 20 feet. The 2 males would watch each other quietly, but eventually the defender would take off after the intruder, either driving him from his perch or actively taking part in a tumble fight. The male on his territory made frequent song flights. Here, the flights reached their perfection with the male making 3 or 4 complete circles, singing his jubilant song all the time.

These song flights were most frequent at the time of territorial establishment and nest building. They also depended on the proximity of other pairs and their stage of nesting. When 2 pairs were beginning to nest at the same time, there was almost constant jockeying between males. I have seen a single male make 6 song flights within 20 minutes, interspersed with much chasing of the adjoining male. Later in the nesting cycle, territorial defense consisted more of chasing than of singing or song flights, although following nest failure or the beginning of a second nesting, territorialism became stronger again.

Although adjoining males sat on their prominent perches staring at each other for minutes on end, I never saw anything resembling a defensive posture such as described in the Song Sparrow by Nice (1937) or the Snow Bunting by Tinbergen (1939). I have just 3 records of any posturing by Goldfinches. In 2 cases I had placed a female dummy within 6 feet of a partially constructed nest. In each case the female came to the nest to place material. On sighting the dummy she crouched, holding her head forward, wings quivering, and uttering a high, fast *chee-chee-chee-chee* for a few seconds before attacking. In a third case I saw 2 males 6 feet apart on a wire doing very much the same thing for a period of a minute or more before going into song flights. I believe the song flight acts as a very strong notice of territorial bounds and takes the place of other forms of display. Certainly, the area bounded by a song flight corresponds fairly closely with the actual boundaries of the area defended.

Conder (1948) observed frequent posturing in the European Goldfinch. It consisted of pivoting through 90 degrees, body extended slightly forward. It was used as a deterrent to intruding males as well as enemies. I often noticed Goldfinches pivoting on their perches, either while in the territory or while feeding, but never associated it with display. Certainly, there was no obvious relation between pivoting and the appearance of intruding males.

Males or females flying overhead across a territory were never attacked. Likewise birds feeding within a territory could often go unmolested. But the instant a male took up a prominent position he would certainly be driven off, if the defender were in sight. Female intruders were likewise driven off, usually by the females.

During 1947, I observed territorial defense at 17 nests. There were 33 cases of male chasing male; 6 of female chasing female; 1 of female chasing a male; and 1 of male chasing female. A single conflict lasted from a few seconds to a half hour. The greatest distance from the nest that a male was seen to defend his territory was 30 yards. The latest territorial defense was September 1, 1947, when both male and female were active in driving off neighboring males and females. At this time the female was incubating her second brood.

The female may take an active or leading part in the selection of territory for, of the 2 adult banded females from 1946 that returned to the study area in 1947, one nested 50 yards from its 1946 nest, the other 15 yards. In 1948 1 adult banded male returned to within 15 yards of its 1947 nest. Two other banded but unidentified females also returned to nest in 1947. Since no aluminum bands were used in 1946, other returns may have been present in 1947, but undetected because of lost celluloid bands. If the males alone selected the territory these females could scarcely have had the chance to build so close to their former nests. Davis (1941) observed that the female kingbird selects the nest site after pairing; the male subsequently defends the territory. Additional evidence for the female selecting the nest site is given later under the section Second Broods.

### Requirements and Size of Territory

*Type:* The Goldfinch territory consists of the nest site and immediate area, but does not necessarily include food, water, or nesting material sufficient for the pair. On the study area the chief nesting material, thistle, grew mostly in several large discrete patches (Fig. 1). Nests were never found in these or in sunflower until toward the end of the season, and then usually only in the smaller patches. I doubt if a Goldfinch could defend such an economic asset against the many Goldfinches seeking its use.

There seems to be a relationship between food supply, nest sites, and population density. In 1944, when there were 36 pairs, 18 nests (35% of total) were built in composite plants, all of which are favored sources of food for Goldfinches. Eleven of these were in giant sunflower, the only year nests were built

in this plant. In 1946 with 54 pairs 13% of all nests were in composites; and in 1947 with 60 pairs, only 5 nests or 5% of the total were in these plants. Hence, in years of high density Goldfinches seem to have difficulty in defending nest sites in plants the seeds of which are in so much demand.

Food, for the most part, consisted of seeds of thistle, Joe-Pye weed, and giant sunflower, all abundant on the marsh, but the birds usually had to forage outside of their territory for them. At 2 springs in the northwest corner of the area I could always count on seeing Goldfinches on a sunny afternoon, either bathing or drinking. Water may well be an essential component of high breeding densities for this species.

Although there were abundant shade trees in the western part of the area affording satisfactory nest sites, these were rarely used (a late fall census after all leaves had fallen still failed to disclose nests in them). The ideal sites were where elderberry grew abundantly and yet close to at least 1 large tree. The highest breeding density in 1947 was on 6.4 acres of marsh where there were 38 pairs. This makes an average territory of 7100 square feet, or a circle of diameter 95 feet. The territories reported by Drum (1939) extended to 1000 feet in length, hence the occurrence of territorialism does not depend on breeding density.

## The Nesting Cycle

Although, in general, the Goldfinch delays nesting later than all other birds in eastern North America, there is a wide spread in nesting records. Roberts (1936) reports a record of a nest with 2 eggs found May 20, 1930 in Minnesota; at the other extreme he reports a nest containing 3 eggs about to hatch on Sept. 30, 1894. For Wisconsin, J. B. Hale of Madison told me of seeing copulation on May 27, 1947. I. O. Buss, formerly of Madison, found a freshly hatched nest on June 26, 1946. Such early nesting records are to be treated as anomalies and bear little relation to the normal sequence of nesting.

Since I was able to locate almost all nests on the study area, the curve in Figure 3 purports to show the dynamics of a nesting population. Since almost all nests were found either in process of construction or with eggs, I was able to date the beginning of the nests to within a few days. Extrapolation, where necessary, was based on nest chronology established at nests with precise records. The curves for 1944 and 1946 were very similar to that of 1947 and hence are not shown.

Nest construction generally started the first week in July, and in 2 weeks had come to a peak, with a minor peak almost an even month later. Nest building had ceased by the first week of September. The closest synchronization of nesting came in 1946 when 57% of all females were building simultaneously, compared with 40% in 1944 and 1947. Analyzing Walkinshaw's data (1939) for 14 nests started in July, 1936, I find a peak of nest building July 23, in close agreement with Madison.

Although nest building reaches a peak of activity about the middle of July, the total number of active nests (being built or containing eggs or young) continues to rise until the middle of August. This is probably due to the steady influx of new pairs to the study area up until that date. These late arrivals might be females that had started nesting elsewhere and then had come into the marsh for subsequent renesting attempts. But of the 53 banded females, the greatest observed move between nesting attempts was 150 yards, and almost all females remained within the same territory. Thus, there must be some physiologically retarded females arriving for an initial nesting attempt a full 6 weeks later than the most sexually advanced females.

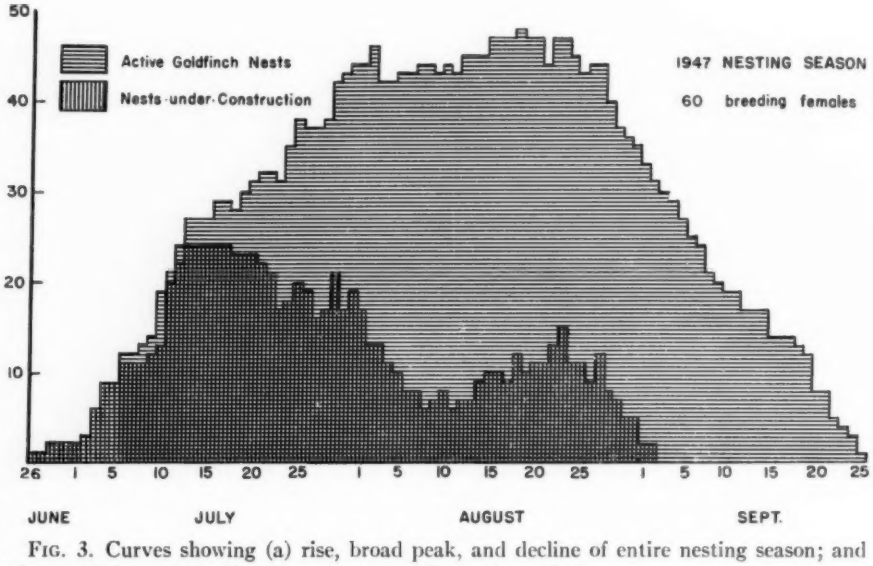


FIG. 3. Curves showing (a) rise, broad peak, and decline of entire nesting season; and (b) two distinct peaks of nest construction within this period.

The curve of total nest activity begins to drop about August 18, indicating the point at which some females stop breeding activity. Thus, the earliest nesters cease breeding at the time that the latest nesters are beginning.

Whereas the Goldfinches of the study area indicate a fairly well defined pattern of nesting, there seem to be geographical differences in the nesting cycle. On July 9, 1947, when many Goldfinches were nesting in Madison, I observed only 50 miles to the north, a flock of over 100 Goldfinches that were just beginning to break into pairs. Males were in process of chasing females in zig-zag flights a full month behind the Madison birds. Outside of this flock that was feeding on catkins of red birch (*Betula nigra* L.) along the Wisconsin River, I saw no other Goldfinches in the area.

The cause for late nesting among Goldfinches has been a subject of speculation among ornithologists, some of whom erroneously believe that these birds are dependent upon the pappus of thistle for lining the nest. There is little reason for believing this is the case, for I have found down from cattail (*Typhus* spp.), willow, and poplar in early nest linings, and in St. Paul early nests are lined with pappus from dandelions and sow thistle (*Sonchus* spp.) (Lewis, Unpub. MS.). The Goldfinch seems to have filled an ecological niche by utilizing seeds of composites as its chief food source, at least at time of nesting. Delaying nesting until July and August ensures an abundant source of food for the young.

There are few common, native composites in eastern United States that bloom early. In Wisconsin, field thistle (*Cirsium discolor*) is the first common, native composite to bloom (mid-July) hence, several centuries ago before the advent of Canada thistle (*Cirsium arvense* L.) and other European weeds, nesting could never have preceded that date by much. Goldfinches were probably much less abundant at that time, unless they were more diverse in their diet than now. At Madison the Canada thistle, the earliest common composite except dandelion, does not bloom until the last week in June and its seeds are not ripe until the first week in July (Zimmerman, Unpub. MS.), so the timetable of hatching nests is about as far advanced as would be safe.

## The Nest

*Site:* Goldfinches will nest in a wide variety of trees, shrubs, and forbs, as long as they are growing in open sunlight. The location of 230 nests found on the area during the 3 years is given in Table 1. The preponderance of nests in

TABLE 1

THE LOCATION OF 230 NESTS ON STUDY AREA

| SPECIES | RELATIVE ABUNDANCE OF PLANT | PER CENT OF NESTS |
|---|---|---|
| elderberry | 10 | 68 |
| dogwood | 2 | 8 |
| box elder | 1 | 5 |
| thistle | 2 | 5 |
| sunflower | 2 | 5 |
| aster | 1 | 2 |
| buttonbush | 0.5 | 2 |
| red maple | 0.5 | 1 |
| Joe-Pye weed | 4 | 1 |
| willow | 4 | 1 |
| poplar | 1 | 0.5 |
| cherry | 0.1 | 0.5 |
| wild lettuce | 0.1 | 0.5 |
| goldenrod | 0.5 | 0.5 |

elderberry is mainly a reflection of the abundance of that shrub, but the total absence of nests from mature elm, willow, and poplar indicates that the Goldfinch has a decided preference for shrubs and forbs. Nests found outside the study area were commonly placed in red-osier dogwood and saplings of willow and poplar. Other plants included red oak (*Quercus borealis* Michx.), red pine

TABLE 2
THE HEIGHT OF 278 NESTS FOUND ON STUDY AREA

| HEIGHT OF NEST ABOVE GROUND IN FEET | NO. NESTS |
|---|---|
| 1 | 0 |
| 2 | 2 |
| 3 | 48 |
| 4 | 82 |
| 5 | 71 |
| 6 | 39 |
| 7 | 15 |
| 8 | 12 |
| 9 | 4 |
| 10–14 | 4 |
| 15–19 | 1 |

(*Pinus resinosa* Ait.), white cedar (*Thuja occidentalis* L.), tamarack (*Larix laricina* Koch), elm, plum (*Prunus*), hawthorn (*Crataegus* sp.), bog birch (*Betula pumila* L.), lilac (*Syringa vulgaris* L.), and nine-bark (*Physocarpus opulifolius* L.), in small numbers.

As the season advanced there was a marked increase in the use of forbs as nest sites. The Goldfinches presumably wait until these forbs have matured, but also many of the formerly favored elderberry bushes have had their crowns opened up by the weight of ripening berry clusters, thus making the nests too exposed and also affording few vertical crotches. Nests started in elderberry may drop as much as 18 inches by the time the berries become ripe, thus imperilling eggs and young in windy weather.

Where insects have attacked the main stalk of a forb, the lateral buds sprout to form an ideal rosette in which to place a nest. Almost all nests found in forbs were placed in such rosettes, and were singularly free from wind damage.

Almost all nests found in shrubs and forbs were from 3 to 6 feet off the ground; those in trees were usually from 8 to 15 feet high (Table 2). The nest is seldom well concealed for the female seeks for nest site a plant that has 2 or more nearly vertical branches forming a crotch in which to place the nest. Thus the nest is either below the leafy part of the plant as in elderberry, or else in some sparsely foliated plant as willow, poplar, or forb. This relationship of the nest to the crown of the plant is brought out by analysis of the 135 nests placed

in shrubs or forbs in 1946 and 1947. Of these, 93% were located within 2 feet of the top, and 99% within 3 feet.

I believe that food supply is a more important determiner of occurrence of Goldfinches than nest site, and that when shrubs are not available these birds will select any available plant with proper branches that grows in the open. I have found no records, however, of Goldfinches nesting in any densities in trees.

*Construction:* In spite of the heavy drain upon the silky fibers of swamp milkweed made by the earlier nesting Alder Flycatchers (*Empidonax traillii*) and Yellow Warblers (*Dendroica petechia*), there remained enough for Goldfinches to use, at least for the first nestings. As late as August 18 females were gleaning the last bits from stalks. Following nest failure females commonly used material from the old nest or even material from a neighboring active nest. Later nesters used nettle blossoms of which the 2 inch long stalks made an excellent binder for thistle down or milkweed fiber. Other nests consisted chiefly of grasses, nettles, or outer coatings of dead forbs. Rarely, the down of cat-tail, Joe-Pye weed, willow, or poplar was also used for lining.

TABLE 3
THE TIME REQUIRED TO BUILD NEST IN RELATION TO NESTING SEASON

| | PERIOD IN WHICH NEST WAS STARTED | | | |
|---|---|---|---|---|
| | July 1–15 | July 16–31 | August 1–15 | August 16–31 |
| Required time to build nest in days | 13.0 | 10.8 | 5.8 | 5.6 |
| Number of nests | 17 | 12 | 4 | 12 |
| Standard Deviation in days | 4.6 | 4.4 | .96 | 1.3 |

As the season advanced, the interval between beginning of nest construction and laying of the first egg decreased steadily from an average of 13.0 days in early July to 5.6 days (statistically significant) in late August (Table 3). For such a late nesting species such an economy of time must materially increase the number of renesting attempts possible.

*Egg Laying:* The number of eggs in a completed clutch varied from 2 to 7 (Table 4). Mean clutch size in July was 5.3 eggs, but by late August clutches averaged only 3.7 eggs (highly significant difference). The drop in clutch size with season probably depends more on the number of renestings than the lateness of the season. The decrease between each of the bimonthly intervals from July 15 to August 31 is highly significant. For 10 females where the sizes of the first and second clutches are known, the first clutch averaged 4.8 eggs (S.D. = .40), and the second 3.8 (S.D. = .87).

TABLE 4
VARIATION IN CLUTCH SIZE WITH SEASON

| DATE FIRST EGG LAID | NUMBER OF NESTS BY CLUTCH SIZE | | | | | | MEAN | STANDARD DEVIATION |
|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | | |
| July 1–15 | 0 | 0 | 0 | 2 | 0 | 0 | 5.0 | — |
| July 16–31 | 0 | 0 | 8 | 34 | 11 | 1 | 5.3 | .65 |
| August 1–15 | 0 | 1 | 8 | 38 | 5 | 0 | 4.8 | .57 |
| August 16–31 | 3 | 11 | 17 | 6 | 0 | 0 | 3.7 | .90 |
| September 1–15 | 0 | 3 | 2 | 0 | 0 | 0 | 3.4 | .49 |
| Totals | 3 | 15 | 35 | 80 | 16 | 1 | 4.6 | |

TABLE 5
THE TIME REQUIRED FOR RESUMPTION OF EGG-LAYING AFTER NEST FAILURE

| DATE OF NEST FAILURE | NUMBER OF DAYS BETWEEN NEST FAILURE AND EGG-LAYING | STAGE OF NEST AT TIME OF FAILURE |
|---|---|---|
| July 8 | 12 | Nest ¾ built |
| July 13 | 21 | Nest complete |
| August 3 | 6 | 8 days incubation |
| August 14–17 | 11–14 | Young 7 days old |
| August 16–20 | 4–8 | 8 days incubation |
| August 21–22 | 7–8 | 1 egg |

I have only 6 records of the time required for a female to start laying following nest failure (Table 5). This time ranges from 21 days down to a possible 4 days. These records suggest that the interval before laying may depend as much on the season of the year as the stage of nesting at the time of break-up. If so, this would agree with the acceleration in nest construction mentioned above.

Although about 30 hours were spent the first year in observing the activities of the male and female during egg laying and incubation, my observations agree closely with those of Mousley (1930a, 1930b, 1932, 1935) and Walkinshaw (1938, 1939) and will not be recounted here.

### Care of the Young

The young must be fed very little the day of hatching, for I saw no food in the crops until the second day. As many as 60 sticky seeds are fed by regurgitation to the young during 1 feeding. One trip by the female to the feeding grounds is sufficient for 2 or 3 feedings when the young are less than a week old. The average time between feedings at this time was about 25 minutes; it decreased as the birds became older, and finally rose again just before the birds fledged.

The young were given the same food as was eaten by the adults. Of a dozen crops examined by artificial regurgitation, only 1 contained any animal matter, a 0.75 inch long caterpillar. Both parents ate small droppings and carried off the larger ones. The nest remained clean until about the eighth day, but extensive fouling occurred within the last 2 days before fledging, the rim becoming a solid mass of excrement (frontispiece). This fouling is not a safe criterion for nesting success, since some nests remained clean right up to the end. Nests with only 1 or 2 young are not immune to fouling, suggesting that it is not the amount of work involved that results in droppings being left.

The first week of life for the young is all victualling and voiding. After that they show more interest in their surroundings. They eye ants and beetles crawling close to the nest, crouch low when danger approaches, spend much time on warm days preening their feathers or occasionally standing up and fluttering their wings. They do not react to calls of nearby Goldfinches but wait for the almost inaudible *per-chee* of the female as she prepares to feed them before raising their heads. The young fledge when 10 to 16 days old (Table 6). The

TABLE 6

AGE OF FLEDGLINGS ON LEAVING THE NEST

| AGE (DAYS) | NUMBER OF NESTS |
|---|---|
| 10 | 9 |
| 11 | 4 |
| 12 | 9 |
| 13 | 7 |
| 14 | 6 |
| 15 | 3 |
| 16 | 2 |
| Totals | 40 |

Mean age at fledging—12.3 days.
Standard Deviation—±1.76 days.

mean fledging age of 12.3 days agrees fairly well with the 12.88 days recorded by Walkinshaw (1939) for 25 young. My banding operations undoubtedly caused some broods to leave the nest earlier than they might normally. This probably accounts for the relatively large number fledging at 10 days.

Within 24 hours before fledging the young develop a call, *chick-kee*, very faint when still in the nest, but audible at 50 yards when once fledged. Fledglings may remain quiet for long periods of time, but seem to recognize the male parent's voice and immediately start this *chick-kee* call. As the male comes into sight they flutter their wings in effort to get to him and utter this call incessantly

until fed. This same note may also be used as a collecting call in answer to the male, who takes over most of the duties following fledging. Whenever disturbed and scattered, the young become silent immediately, but after a few minutes they resume the *chick-kee* call, apparently to signal their presence. A week after leaving the nest, this call evolves into *chick-kee-dee*, very similar to the call of the Chickadee (*Parus atricapillus*) both in quality and pitch. It is given by the young as they follow the male about the marsh and has been heard well into October.

Reds, a male bird taken from the nest at 3 days and held in captivity, shed considerable light on the development of certain traits. Although he gained weight much more slowly than wild birds, his rate of feathering was about normal. At 13 days he was hopping about the floor, and 2 days later was able to fly up 10 inches. By 16 days he was hopping strongly and flying across the room. The next day he was seen pecking at food. By 19 days he was eating by himself, although he would still accept food from a stick. By 20 days he was a strong flier circling the room with ease and landing without a falter. By this time he had learned to drink from a dish. By 30 days he was shelling his own seeds.

Some of the stimuli for gaping were shown by Reds and his fellow orphans. Although the female may at times give a soft call to the young when she is ready to feed them, this is apparently not a necessary stimulus. Captive young at 3 or 4 days gaped when the edge of the nest was tapped or when their bills were touched with food. At about 7 days they gaped at the mere sight of food if hungry enough. When week-old young were put in closely placed nests they would attempt to be fed by the birds in the other nest, even moving over bodily into the other nest in their efforts. But once together in a nest again they would no longer try to be fed. Hence, sight of a bird, regardless of size outside of the nest, also acted as a stimulus to gaping.

## Second Broods

It has been assumed that the Goldfinch is single-brooded because of its late nesting. Mousley (1935) gave some evidence on the basis of behavior that it might raise a second brood. Much to my surprise, in 1944 I found one definite record of a banded female starting a second nest following fledging of her first brood in August. In 1946 and 1947 with many more birds banded early in the season, I found 9 more females starting a second brood. I believe that most females that raise their first brood before August 20 start on a second brood. The lateness of the season is no deterrent to them, for birds were found in the nest as late as September 23 in most years. Brother Hubert Lewis found 2 broods fledging on October 15, 1946 in St. Paul, Minnesota, so in extreme cases a second brood might be started as late as September 15.

As the young reach fledging age, the male takes over most of the feeding, thus giving the female time to start her new nest. One female started her new

nest 3 days before her first brood fledged. Therefore the stimulus for renesting must precede fledging by at least 3 days. The first egg of the second clutch was laid anywhere from 3 to 10 days, but usually 5 or 6 days, following fledging in the first nest. The time between the start of the first and second clutches is remarkably uniform. Four females required 33 days, 3 took 34 days, and 3 others took 32, 35, and 36 days. Second clutches were begun between August 10 and 27.

In only 3 cases have I had both male and female of double-brooded birds banded. In 2 cases the female kept her mate and built within 20 yards of the first nest. In the other case I strongly suspect that the female changed mates although retaining her old territory. While watching her from a blind I saw her being fed at her new nest by an unbanded male. To the many males that were flying overhead she paid no attention. But when shortly afterwards a male with 5 young settled into a clump of sunflowers close to the nest, the female got off her eggs and uttered the high *chee-chee-chee* so typical of a female expecting her mate to come to the nest. I could not see whether the male was her old mate, but the behavior of the female and the size of the fledged brood suggested this. It looked here as though the female had taken a new mate, but had not completely severed her bond with her former one. Unfortunately, the nest was destroyed that night before I could watch her further.

In 4 cases the female built her nest in an entirely new territory, as far as 150 yards from the first nest. These new territories were vigorously fought for with neighboring males. In one case the male was scarcely allowed to reach the female on the nest without being driven off by a neighboring male whose territory had been reduced by the newcomer. This looks like further evidence that the female selects the nest site, in this case having placed her nest in an almost untenable position that would scarcely have been the case if the male had free selection of territory. There remains the possibility that a second-nesting female may have to seek a new mate if her old one is no longer sexually active. But the chance of an unmated male still being sexually active at this late date would probably not be any greater than for a mated male, which after all has been stimulated by courtship feeding and territorial defense during most of the preceding nest cycle. Cessation of sexual activity is usually associated with onset of molt. In Madison the first males began to show post-nuptial molt the first week in September, so this event would signal cessation of further nesting.

How extensive is second nesting among Goldfinches? In 1947 6 out of 30 banded females raised a second brood; in addition, 3 unmarked females almost certainly raised a second brood. Hence, a probable minimum of 15% of the 60 breeding females were double-brooded. At first glance the prominent second peak in the nest construction curve (Fig. 3) with its close coincidence with second nesting suggests an extensive amount of second nesting. In 1947 there were 37 nests started after August 5, the earliest record for beginning of second nesting. These nests were built mainly by 2 categories of females: those renesting after nest failure, and those beginning a second brood. For lack of more

TABLE 7

RELATION OF NEST FAILURE AND SUCCESS WITH SEASON

| PERIOD IN WHICH NEST FAILURE OR FLEDGING OCCURRED | NUMBER OF NEST FAILURES | NUMBER OF SUCCESSFUL NESTS | PER CENT OF NESTS SUCCESSFUL |
|---|---|---|---|
| July 1–10 | 0 | 0 | — |
| July 11–20 | 14 | 0 | 0 |
| July 21–30 | 19 | 0 | 0 |
| July 31–August 9 | 14 | 1 | 7 |
| August 10–19 | 22 | 12 | 35 |
| August 20–29 | 34 | 29 | 46 |
| August 30–September 8 | 28 | 19 | 40 |
| September 9–18 | 4 | 17 | 81 |
| September 19–28 | 0 | 16 | 100 |
| September 29–October 8 | 0 | 0 | — |
| Total | 135 | 94 | 41 |

precise information one must assume that females in either category are equally likely to begin a new nest. A comparison of nest records during July and August shows that for each 10 day period more nests failed than were successful (Table 7). Hence, considerably more than half of the 37 nests started after August 5 must have belonged to renesting females. Therefore, the second peak in nest construction can be attributed only partially to second nesting. A total of 7 females reared second broods.

## Mortality

During the 3 years, 65% of the total number of eggs laid hatched and 49% of all eggs produced fledglings (Table 8). The only certain cause for mortality I ever found was from storms. Nests built in elderberry heavy with fruit or in

TABLE 8

NESTING SUCCESS AND PRODUCTIVITY

| | 1944 | 1946 | 1947 | TOTAL |
|---|---|---|---|---|
| Number pairs | 36 | 54 | 60 | 150 |
| Total nests | 56 | 81 | 102 | 239 |
| Total eggs | 170 | 206 | 320 | 696 |
| Eggs hatched | 108 | 119 | 228 | 455 |
| Young fledged | 63 | 92 | 183 | 338 |
| Per cent of eggs hatched | 64 | 58 | 71 | 65 |
| Per cent eggs producing fledglings | 37 | 45 | 57 | 49 |
| Av. number young per pair | 1.7 | 1.7 | 3.0 | 2.3 |
| Per cent of females raising fledglings | .39 | .48 | .75 | .57 |

forbs were sub ject to destruction by high winds and were found tilted so far over that eggs or young had fallen out. Three or 4 deserted nests were soon covered over and inhabited by Deer Mice (*Peromyscus leucopus*). I suspect that they may eat eggs from nests that were not being incubated, for I found mouse feces in the bottom of a freshly deserted nest. Garter Snakes (*Thamnophis sirtalis*) curled up beside nests on several occasions made me suspect them. One in particular was right in the bowl of a nest subsequently deserted.

Trautman (1940) found 4 out of 16 nests at Buckeye Lake parasitized by Cowbirds (*Molothrus ater*). Since these 4 nests were all found within a period of 9 days and in the same field, he suggests that a single late Cowbird might have laid eggs in all 4 of these nests. His field notes indicate that ordinarily there is little overlap between egg-laying of Cowbirds and Goldfinches (letter). I had only 1 case of parasitism and this was in a nest in which egg-laying started July 25.

Undoubtedly some nest failure was through death of the female, although with such a high density of breeding birds, most of them unmarked, it was not possible to determine this. Indirect evidence, however, points to considerable adult mortality. During the 3 years the 150 pairs laid 696 eggs, an average of 4.6 per female. But the mean size of complete clutches laid during July and the first 2 weeks of August was 5.0 eggs. If there had been no adult mortality one would expect that each female would average somewhat more than 5 eggs laid during a season, for some were double-brooded and many others had their first nest destroyed with eggs or young in the nest. It is difficult to conceive that a female would never succeed in laying at least 1 full complement of eggs. Hence there must have been considerable female mortality to keep the ratio of eggs laid to total breeding females down to 4.6.

### Productivity

In 1947, 57% of all eggs eventually produced fledglings, compared with 37% in 1944, and 45% in 1946 (Table 8). This productivity must be considered minimal, for during 1946 and 1947 some adult birds were trapped at the nest site, which probably caused desertion in some cases. However the desertion rate at unmolested nests was just as high as at nests where trapping was carried on. And the year of lowest fledging success was when no banding was done until the young were ready to fledge.

Walkinshaw (1939) found 58% fledging success from 248 eggs, and Lewis (unpub.) reports 80.3% on the basis of 608 nests located in thistle found during the years 1943 through 1946 at St. Paul, Minnesota. The difference in nesting success between St. Paul and Madison is highly significant and one must infer that there are environmental differences between the 2 areas. The St. Paul study area was in the city suburbs with presumably fewer mammalian predators.

The location of the nests in thistle may also have acted as additional protection against predation or storms.

During 1944 and 1946 each breeding female produced an average of 1.7 young; in 1947 an average of 3.0. Until much more banding has been done and mortality tables of both juveniles and adults worked out, one cannot say how many young must be raised to maintain the population. If there is any truth in the old saw "safety in numbers," Goldfinch flocks may suffer less mortality than non-flocking species, in which case relatively low brood success would suffice to maintain the population.

## Summary

A 3-year nesting study with emphasis on behavior, territory, and breeding success was made on 24 acres of park and marshland in Madison, Wisconsin. The area was frequently searched for nests and their outcome determined by visits every 2 or 3 days. Seventy-nine birds were banded in the early stages of the nest cycle to facilitate behavior study and estimates of the population.

Pair formation took place in May or earlier while birds were still in flocks. Elements of pair formation included courtship song, courtship flights, song flights, and true song. After pair formation, birds left the flocks, but did not take up territory until just before nesting began. The bond was maintained by the male feeding the female, as well as by song. Territory was defended vigorously by males, either by chasing, taking up prominent perches, or by song flights. Defense was strongest at the beginning of the cycle, but occasionally lasted until young were in the nest. It appeared again with renesting and second nesting. The territory did not necessarily include food, water, or nest material. In the area of densest population territories averaged 95 feet in diameter.

Nest construction began in July and reached a peak the middle of July. New pairs continued to enter the study area until the middle of August, by which time some females had already completed nesting. Breeding densities on the area increased from 36 pairs in 1944 to 54 in 1946, and 60 in 1947. Nests in shrubs and forbs were usually from 3 to 6 feet high; those in trees 8 to 15 feet. Of 230 nests found 68% were in elderberry, the commonest shrub on the area, but 22 other species of plants were utilized to lesser degree. Nest construction took an average of 13.0 days in early July and decreased steadily to an average of 5.6 days in late August.

Clutch size of 150 nests ranged from 2 to 7 eggs. Mean clutch size in July was 5.3 eggs, but for late August was only 3.7. Six records of renesting females indicated from 4 to 21 days were required between time of nest failure and subsequent egg-laying.

A captive Goldfinch was raised to study behavior. It was eating independently at 19 days, was a strong flier at 20 days, and was shelling seeds at 30 days.

Stimuli for gaping in young birds included tapping the nest, touching the bill, and the presence of other nestlings in an adjacent nest.

Approximately 15% of Goldfinches start a second brood between August 5 and September 1. The female may change mates, but more often retains the same mate and territory. In 1 case the female started a new nest 3 days before the young in the first nest had fledged. A total of 7 females reared second broods.

During the 3 years, 65% of all eggs hatched and 49% produced fledglings. This compares with 58% and 80.3% in 2 other regions. Storms were the only definite cause for nest failure, but Deer Mice, Garter Snakes, and death of the female were probable factors. The number of young produced per pair ranged from 1.7 to 3.0.

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# THE BRANT OF PRINCE PATRICK ISLAND, NORTHWEST TERRITORIES

BY CHARLES O. HANDLEY, JR.

THE systematic relationships of the small, black-headed geese of the genus *Branta* have long been a center of lively controversy. Opinion has varied as to whether they belonged to one species or two. Birds wintering in Europe are now believed to belong to a single species, *Branta bernicla* (Linnaeus), and two races of this species are considered valid—a dark-bellied one, *bernicla*, breeding in western Siberia and on islands north of the European mainland, and a light-bellied one, *hrota* (O. F. Müller), breeding in the eastern American arctic and on islands northwest of Europe (Witherby *et al.*, 1939: 215). *Hrota* winters extensively in the New World also, especially along the Atlantic coast. The distinctness of a third form, *nigricans*, breeding in eastern Siberia and the western American arctic, has never been denied. With it the problem has been one of degree of difference. Is it related to *B. bernicla* as a subspecies or as a species? G. N. Lawrence described it as a full species. For a long time it was regarded as such, but ornithologists who visited the western American arctic continued to report the presence of both *nigricans* and *hrota* there in summer. Series composed of breeding *and winter* specimens from various parts of North America could be arranged in such a way as to show almost complete intergradation between the two forms. This intergradation, which allegedly could "be traced over the circumpolar circle in northern Europe and Asia" (Taverner, 1926: 110) was accepted by taxonomists as evidence that the forms were not biologically isolated hence not specifically distinct. *Nigricans* was therefore reduced to subspecific rank in the 19th supplement to the third edition of the A.O.U. Check-List of North American Birds (1944. *Auk*, 61: 443).

The area throughout which the breeding ranges of *hrota* and *nigricans* are believed to overlap is extensive. Bent (1925: 238), on Taverner's authority, states that both forms have been taken on Melville Island, Northwest Territories. Taverner (1926: 110) states that "light and dark-bellied birds seem to meet in the islands of Franklin [i.e., the Arctic Archipelago] without interbreeding. . . ." Gavin (1947: 198) discovered separate nesting colonies of both *nigricans* and *hrota* in the Perry River district south of Queen Maud Gulf. Hanson, Scott and Queneau (1949: 226) also found both these forms at Perry River, but apparently only *nigricans* was nesting that season. The comments of Bird and Bird (1936: 606), Schiøler (1925: 497–523), and Jourdain (1936) suggest that the breeding ranges of *nigricans* and the nominate race overlap in western Siberia.

If *nigricans* and *hrota* do actually interbreed anywhere in the western American arctic, it is somewhat surprising (a) that no one has encountered mixed

pairs in that vast area; and (b) that there are so few *true* intermediates in museum collections. By 'true' intermediates I mean *breeding* specimens neither dark enough below for *nigricans* nor light enough below for *hrota, and collected in the area of overlap*. Numerous specimens have been preserved which are intermediate in a very broad sense. Most *B. b. bernicla* of the Old World are neither dark enough below for *nigricans* nor light enough below for *hrota*, yet obviously those far removed birds are not intermediates between *nigricans* and *hrota* in a genetic sense. Moffitt (1932: 308) says: "I know of no single specimen ever having been procured in America showing indications of interbreeding."

In the course of investigations on Prince Patrick Island, Northwest Territories, in 1949, I found both *nigricans* and *hrota* common as nesting birds. *Nigricans* was the more numerous. The two forms arrived almost simultaneously, giving no hint of any difference in migration routes. This was not surprising, perhaps, in view of the lateness of the arrival date. The first birds I saw appeared to be a pair. They came in on 12 June, a dreary, foggy day. They circled back and forth low over the snow-covered river delta, the coastal hills, and unbroken ice of the bays, searching for open water or a bare spot of land on which to alight. I could not identify them except as brant. On the 15th I saw four flocks. One flock, composed of four *nigricans*, grazed on a small spot of lush grass and moss tundra which had melted clear of snow. They were reluctant to fly as I approached and returned to the same spot after I had moved away. Other flocks, proclaiming their arrival with a musical honking and croaking, were migrating up icebound Crozier Channel. A flock of eleven came in low over the ice and lit at a meltwater pool on the beach near my camping spot. They rested, drank, bathed, preened, chased each other around with extended necks as though courting, gabbled continuously, and occasionally uttered soft honking notes. Most of these birds appeared to be *nigricans*, but two were quite light and may have been *hrota*, although I could not be sure. The first undoubted *hrota* I observed on 17 June. That day I collected a pair as they grazed on a muskeg island which had just emerged from the snow of a river delta. On subsequent days brant frequently visited this same area, but the two forms almost always kept separate from each other.

As soon as the south and west slopes began to clear of snow, the brant commenced nesting. The tundra was more than eighty percent snow covered, and snowshoes were still necessary for travel, when on 22 June, on the gentle, well vegetated lower slopes of a mountain three miles inland, I located my first nests. These slopes were among the first vegetated areas to dry out sufficiently to allow nesting. I observed about a dozen pairs of brant scattered over several square miles, and found three nests. One of the nests contained four eggs, so it must have been started soon after 12 June. In addition to the nesting pairs, I saw several flocks of four to twenty individuals on the nesting area. These birds were so intent on grazing that I could not help believing that they had

just arrived. This was the first date on which I observed large numbers of brant. Pairs of typical *hrota* and pairs of typical *nigricans* both nested on these same slopes, with nests as little as two or three hundred yards apart. Other nests, less than a dozen in all, and scattered widely, I found on other well vegetated dry tundra in the vicinity, but I found no colonies. With the exception of two destroyed nests on rocks near the beach, all nests that I found were at least one mile inland.

Nesting habitat of Brant on Prince Patrick Island in mid-July. The bird is a Long-tailed Jaeger (*Stercorarius longicaudus*) at its nest. Note the snowbank; the bareness of the distant slopes; and the prevalence of grass in the foreground. Photograph by Charles O. Handley, Jr.

The summering population probably totalled fewer than one hundred individuals. A large number of these apparently did not attempt to nest. It is possible that the late thaw had much to do with this. The tundra was still seventy percent snow covered by 30 June. In general, the summering flocks did not mix, although they used the same tundra and the same ponds to a large extent.

All the nests which I found were destroyed by dogs or foxes (*Alopex*), although the fox population appeared to be not unusually high. Very few goslings

were found. The earliest of the season were located by S. D. MacDonald of the National Museum of Canada on a shore-lead on 23 July. I am not sure of the form to which these belonged because I did not see the parents. I found other broods, a total of five in all, on inland ponds on 29 July and 3 August. Three of these broods were *nigricans*. I am not sure that any of the young brant were able to fly by the time of the freeze-up the first week of September. The only one upon which I could keep a check was about three-fourths grown and partly fledged on 30 August.

The fall migration, which began about the first of August and continued to the end of the month, seemed to proceed in a leisurely manner. The birds apparently left the island a few at a time throughout this period, in flocks varying from four to thirty individuals. The last *nigricans* were observed on 30 August, the last *hrota* on the 31st. I was surprised on 14 August to encounter a flock of about four hundred individuals grazing in a flooded meadow along Crozier Channel. The only portion of the flock that I could see clearly appeared to be *nigricans*. Perhaps this flock was made up of birds which had summered farther to the northeastward on Prince Patrick, on the Bordens, or in Isachsen Land, all of which places are known to be inhabited by brant. I think there were few, if any, local birds in the flock.

In summary it may be stated that both the Black Brant, *nigricans*, and the American Brant or Light-bellied Brant, *hrota*, nested on Prince Patrick Island in 1949. Differences in arrival and departure dates of the two forms were slight and probably insignificant. The two forms nested in the same habitat, even on the same slopes more or less side by side, showing no ecological separation. Neither form nested in colonies. Non-breeding birds of both forms frequented the same ponds and tundra. I observed no mixed breeding pairs and only infrequently observed what I thought to be a mixed flock. Thirteen adults collected at random for the U. S. National Museum were all typical of one form or the other. Nine were *nigricans*, four were *hrota*, none was intermediate.

So-called intermediates between *nigricans* and *hrota* which have from time to time been taken in North America may not be true intermediates (i.e., intermediates in a genetic sense). They may be stray *Branta b. bernicla*. It would be hardly reasonable to suppose, however, that two such apparently closely related forms, nesting in intimate association as they did on Prince Patrick Island in 1949, would not occasionally interbreed. Since I did not actually observe any such interbreeding, and since the two forms appeared to be biologically isolated despite their geographical and physical proximity, they should, I believe, be considered specifically distinct.

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UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY, ANN ARBOR

## NEW LIFE MEMBER

Since her childhood on a farm in Kalamazoo County, Michigan, Hazel Louise Bradley has been interested in birds. She received her bachelor's degree in agriculture from Michigan State College and her master's degree in biology from the University of Michigan, and for the past sixteen years has taught biology at the Jackson (Michigan) High School. Since 1946 she has served the Michigan Audubon Society as Recording Secretary. She is now the Secretary-Treasurer of the Jackson Audubon Club. She has been active as a bird-bander and as a County 4-H Club Leader in Upper Michigan. She has published two papers in *The Jack-Pine Warbler*—one on the Chipping Sparrow, one on the Indigo Bunting, the latter based on studies carried on at the University of Michigan Biological Station at Douglas Lake. Miss Bradley is interested in trees, flowers and mosses, counts bicycling and bowling as favorite hobbies, and is known among her friends for her swift pace as a hiker.

## GENERAL NOTES

**Gannet, Wood Ibis, and Gull-billed Tern along the coast of Mississippi.**—From August, 1949 to late January, 1950 I was stationed at Keesler Field, Biloxi, Mississippi. The following three species of birds, which I observed there during that period, seem worthy of record. The first two are not even listed by T. D. Burleigh in his 'The Bird Life of the Gulf Coast Region of Mississippi,' and the last he reports only from islands well out from the mainland (1944. *Occ. Papers Mus. Zool.* Louisiana State Univ. No. 20, p. 382).

*Morus bassanus*. Gannet. On January 2, 1950, in Mississippi Sound about 8 miles offshore from Biloxi, I saw a number of Gannets. Although the day was misty, I identified ten individuals with certainty. Four of these were in mottled plumage. The birds were fishing in a loose flock.

*Mycteria americana*. Wood Ibis. On October 16, 1949, while observing shorebirds about six miles west of Biloxi, I saw a small flock of Wood Ibises flying eastward about five hundred yards off shore. With 8x binocular I could clearly see the dark colored heads and necks and extensive black of the wings.

*Gelochelidon nilotica*. Gull-billed Tern. Among a large flock of Forster's Terns, *Sterna forsteri*, sitting on some pilings along the sea wall at Biloxi, I saw four Gull-billed Terns in winter dress on August 31, 1949. This was the only occasion on which I noted the species.—Lt. KARL W. HALLER, *Box 3344, Killeen Base, Killeen, Texas.*

**Winter copulation of Mallards.**—The disposition of the Mallard (*Anas platyrhynchos*) to engage in coition outside the normal breeding season seems to have been generally overlooked in North America. Bent's 'Life Histories of North American Wild Fowl' (1923) contains no mention of it, and no recent reference has been made to it in *The Wilson Bulletin*, *The Auk*, or *The Condor*. On the other hand, Boase (1931. *Brit. Birds*, 25: 17) has reported "actual pairing" in Scotland as early as December 6 on salt water, and January 1 on fresh water. In 1910 Heinroth stated that coition was common among Mallards on the European continent after September throughout the fall and winter (*Verh. d. V. Internat. Ornith.-Kong., Berlin*, p. 679) and similar statements in the Handbook of British Birds (1939, 3: 234) are based to a considerable extent on Heinroth.

At Roaches Run Waterfowl Sanctuary near Washington, D. C., on January 21, 1950, my attention was attracted by the bobbing of a male Mallard before a female. Soon the female also started bobbing, and presently she was mounted by the male. These Mallards belonged to stock which commonly migrates north about the middle of March. In recent years, however, a few birds have become permanent residents. On April 24, 1949, I observed a female with six young at the sanctuary. This female was probably one of the sedentary birds. The water is brackish.—FRANK C. CROSS, *9413 Second Avenue, Silver Spring, Maryland.*

**Ruffed Grouse eats snake.**—On September 30, 1949, near Crane Lake, Minnesota, my wife and I noticed a garter snake (*Thamnophis sirtalis*) dead in the road. It was about 12 or 13 inches long and had not been much damaged. About an hour later, as we were walking back along the road, we encountered a Ruffed Grouse (*Bonasa umbellus*) with about half of what we assumed to be the same snake hanging from its mouth. As we watched from a distance of 18–20 feet, the grouse, which appeared to be nearly full-grown, continued swallowing the snake, but it obviously was having difficulties. It seemed to be disturbed by us, and in a few minutes ran into the woods with about 5 inches of the tail of the snake hanging from its mouth.—J. S. FINDLEY, *1201 South Center Avenue, Sioux Falls, South Dakota.*

**Malay Banded Crake off the island of Mindanao in the Philippines.**—At 4 o'clock on the afternoon of October 3, 1945, while the U. S. S. *Jamestown* was steaming through the Sulu Sea seven miles due west of Dohinoc, Mindanao, a rail—subsequently identified as a Malay Banded Crake, *Rallina fasciata*—collided with the ship's superstructure, stunned itself, and fell to the deck. A crew member brought the bird to me. Its legs, feet and eyes were red, the latter of a very bright shade. Wondering whence it could have come, I noticed dark storm clouds and heavy lightning over the island in the vicinity of Dohinoc. On skinning it I found it to be a male. Its testes were not enlarged.

The specimen is now No. 113,947 in the collection of the University of Michigan Museum of Zoology. It is one of 46 specimens known to be in museums of the United States at this time. The American Museum of Natural History has 24 specimens, the U. S. National Museum 11, the Chicago Natural History Museum 4, the Museum of Comparative Zoology at Harvard 3, and the Academy of Natural Sciences in Philadelphia 3.

*Rallina fasciata* has not previously been reported from Mindanao, although it has been found on Palawan (Lowe, *Ibis*, 1916, p. 611), Balabac (Everett, *Ibis*, 1895, p. 32), and Mindoro (McGregor, *Philippine Journ. Sci.*, 1906, p. 698) in the Philippines. It is known to inhabit India, Burma (Sharpe, *Cat. Birds Brit. Mus.*, 1894, 23: 75), Siam (Gyldenstolpe, *Ibis*, 1920, p. 763) and "the Malay Peninsula; Sumatra; Java; Borneo; Lesser Sunda Islands; . . . Pelew Islands; Moluccas (Halmahera, Batjan, and Buru)" (Peters, 1934. Check-list of Birds of the World, 2: 171). The Mindanao record does not extend the periphery of range, but it does fill the gap which has existed between Mindoro to the north and the Moluccas to the south and Palawan to the west and the Pelew Islands to the east, strongly suggesting that this little known rail may inhabit the central Philippine Islands.—KENNETH W. PRESCOTT, *University of Michigan Museum of Zoology, Ann Arbor.*

**Death of a Horned Lark in territorial combat.**—On March 4, 1950, my husband and I, in company with Robert A. Whiting and Kenneth Bunting of Jackson and George M. Sutton of Ann Arbor, visited various parts of Jackson County, Michigan, checking early duck arrivals. The morning was bright, the wind brisk and from the northwest, the snow several inches deep, and the temperature about 20° F. In the vicinity of Clark Lake we continued to see pairs or small flocks of Prairie Horned Larks, *Eremophila alpestris praticola*, many of them in snowless places at the very edge of the highway. Near a slough just north of Jefferson Road and west of South Woodlands Road we stopped to look at some Tree Sparrows (*Spizella arborea*) and a Song Sparrow (*Melospiza melodia*).

Having climbed the embankment near the highway and started through a young cherry orchard toward the slough, we happened to see and hear ahead of us two Horned Larks. That these birds were neither a pair nor part of a flock was soon apparent. They were males in bright plumage. As they walked and ran about on the snow they continued to twitter excitedly, occasionally singing a full song. Often they stood high, with 'horns' lifted, or crouched, 12–15 inches apart, facing each other defiantly. Occasionally they sang in duet. We soon realized that we were witnessing a territorial conflict, for the birds, despite the sweetness of their singing, were obviously opposing each other determinedly. They did not run at each other, but flew instead; and when they met, midair, they rose fluttering straight up to a height of 30 or 40 feet, pecking and clawing at each other the whole way. Their twittering never ceased, but they resumed their singing only after descending to the ground and taking positions a few yards apart. Not once, during the 15 minutes or more that we watched them, did one drive the other about. One flew at the other, the other seemed to accept the challenge without giving ground, and up they went, fighting hard. Usually they rose quite rapidly and directly, but the wind carried them away from the area in which they continued to show interest and to which they invariably returned. For a time we thought

one bird was showing signs of weariness, the other of victory, but when they flew at each other and fluttered upward we found it quite impossible to be sure which was which.

Somewhat to our surprise, and almost certainly without our frightening them off, both birds flew upwind and across the highway, still twittering and bickering. We did not keep our eyes on them, but judged from the singing that they were continuing their fighting just across the highway. Turning our attention momentarily to the sparrows we had started after in the first place, we began our return to the car.

As we started to cross the highway Mr. Bunting called to our attention a 'dead bird' in the highway about 25 yards away in exactly the direction of the twittering we had last heard from the fighting Horned Larks. Using our binoculars, we instantly saw that the 'dead' bird was a male Horned Lark, and that a *living* male Horned Lark was beside it apparently pecking at its wings and tail as if trying to rouse it. Approaching, we found that the 'dead' bird was actually still alive, but it was obviously done for. As it struggled feebly, spreading its wings and tail, the other bird twittered, ran at it, gave it a peck or two, and flew off. We were only five or six yards away at that time.

Picking the doomed bird from the ground we watched it expire in our hands while the living bird twittered only a few rods away. We were greatly puzzled as to exactly what had happened. Each of us sensed that this was the very bird we had been watching and we could not help wondering whether it had died from exhaustion or been dealt a lethal blow by the other bird. One thing was certain: the bird could not have been lying there when we had crossed the highway a little more than a quarter of an hour before; it had been mortally injured within the past few minutes.

Some of our questions were answered when we made a skin of the specimen that evening. The bird was in excellent condition. It weighed 34 grams. Though not fat, there was a considerable amount of food in its gizzard. There was no evidence of fractures. The skull, however, showed moderate hematoma along the parieto-occipital suture line, and there was a mild hematoma across the upper back and left shoulder. These wounds (which had not torn the skin) suggested a blow of sufficient force to involve the central nervous system and cause death. Our conclusion was that the bird, its attention focussed primarily upon its opponent and its perceptive powers somewhat dulled by the long and strenuous combat, had struck a telephone wire while fluttering upward and thus met its tragic end. The wind had carried it, still fluttering no doubt, to the highway, where we had found it. Reviewing what we had seen of the two birds—the dying and the 'victorious', we decided that the latter probably had been just as much bewildered and surprised—in its way—as we had by the refusal of the other to continue fighting.

Pickwell (1931. *Trans. Acad. Sci. St. Louis*, 27: 56) states that "all quarrelling" between male Horned Larks defending territories "takes place in the air." He describes the "curious game of tit for tat" which the birds play, "one now chasing, next being chased. . . ." Sutton (1927. *Wilson Bulletin*, 39: 133), however, mentions "tussels on the ground" which may have been in defense of territory.

Mr. Bunting returned the following day to the scene of the above-reported observations, finding a pair of Horned Larks not far from the highway. This pair probably nested somewhere in the vicinity.—Betty Darling (Mrs. Powell) Cottrille, *6075 Brown's Lake Road, Jackson, Michigan.*

**White-breasted Nuthatch and Tufted Titmouse hawking for insects.**—On the evening of August 13, 1949, I watched a male and female White-breasted Nuthatch (*Sitta carolinensis*) hawking for flying insects in and about a white elm (*Ulmus americanus*) at my home. The birds frequently made flights of a few yards, generally with some abrupt turns, just inside or outside the peripheral twigs of the tree, about 30 feet above the ground. Less frequently they flew out from the tree as much as 10 yards. Once, when the male alighted

after such a flight, I saw a clear-winged insect in his bill. The nuthatches hawked steadily for eight minutes. On the evening of August 30, I saw a different (banded) male nuthatch make a twisting flight, apparently hawking, from the same elm to another tree. I also saw a Tufted Titmouse (*Parus bicolor*) make a hawking flight from the tree. Winged ants were flying about the immediate vicinity on both evenings, and the birds may have been capturing them. I have not found any previous record of such feeding by either *Sitta carolinensis* or *Parus bicolor*. Bent (1948. *U. S. Natl. Mus. Bull.* 195: 27, 28, 52) cites records for the Red-breasted Nuthatch (*Sitta canadensis*) and Pygmy Nuthatch (*Sitta pygmaea*), and there are records for *Sitta europaea* (1949. *Brit. Birds*, 42: 56, 386).—HERVEY BRACKBILL, *4608 Springdale Avenue, Baltimore 7, Maryland.*

**The Carolina Wren, *Thryothorus ludovicianus*, as a mimic.**—Though mimicry by this species has been reported many times, some ornithologists still seem to have reservations on the subject. Bent (1948. *U. S. Natl. Mus. Bull.* 195: 212) summarizes the literature, listing 12 bird species the Carolina Wren has been thought to imitate. The name 'mocking wren' has been applied to *Thryothorus ludovicianus* in publications on the birds of Pennsylvania, the District of Columbia, Indiana, Iowa and Missouri, and 'mocker' has been applied to the bird in New Jersey.

While looking over some old notebooks recently, I found substantially this entry under date of April 30, 1903 (locality, Bloomington, Indiana): A Carolina Wren singing; the song was so like that of a Chewink (*Pipilo erythrophthalmus*) as to deceive me until I saw the performer.—W. L. MCATEE, *6200 Woodlawn Ave., Chicago 37, Illinois.*

**A Black and White Warbler's Nest with Eight Cowbird Eggs.**—In an oak-hickory woodland about three-quarters of a mile southeast of Half Moon Lake, Washtenaw County, Michigan, I found, on May 16, 1949, a nest of the Black and White Warbler (*Mniotilta varia*) which contained not only 2 eggs of the Warbler, but also 8 of the Cowbird (*Molothrus ater*). The nest, constructed of grasses, dried leaves, hair and shreds of inner bark, was only 80 mm. in diameter, within, and was about three-quarters roofed over. The entrance was approximately 75 mm. wide by 50 mm. high. The female bird was on the nest and flew when I approached closely.

Within the next 4 days, I visited the nest twice, finding the female Warbler present, her mate still absent. She was apparently obtaining her own food. On one occasion, she left the nest only when I came very near, and she moved quickly along the ground, trailing her outspread left wing and twice falling, as if in an effort to draw my attention from the nest. Following the Warbler, I discovered, only 40 feet from her nest, a Towhee's nest, where both parents were attending 3 nestlings.

On May 26, I found that the 2 Warbler eggs had been removed from the nest, one destroyed completely, one punctured and lying nearby. (Fortunately, the full contents of the nest had been photographically recorded, earlier.) Whether the Warbler had removed her own eggs or whether this was the work of a Cowbird that returned even at this late date is, of course, not known.

Dr. George M. Sutton and Mr. Haven Spencer accompanied me to the nest on May 30 and succeeded in photographing the Black and White Warbler atop the pile of Cowbird eggs in her nest (Figure 1). We measured the eggs and compared patterns of speckling, photographed the group together and returned them to the nest. In Figure 2, the eggs are numbered, left to right, 1 to 4 in the top row and 5 to 8 beneath. Measurements, in millimeters, were as follows:

| | | | |
|---|---|---|---|
| 1.—21.3 x 16.6 | 3.—22.3 x 15.5 | 5.—21.7 x 15.2 | 7.—23.6 x 16.4 |
| 2.—21.6 x 16.4 | 4.—22.5 x 15.4 | 6.—22.2 x 16.1 | 8.—22.8 x 16.3 |

The damaged Warbler egg measured 17.8 x 14.0 mm.

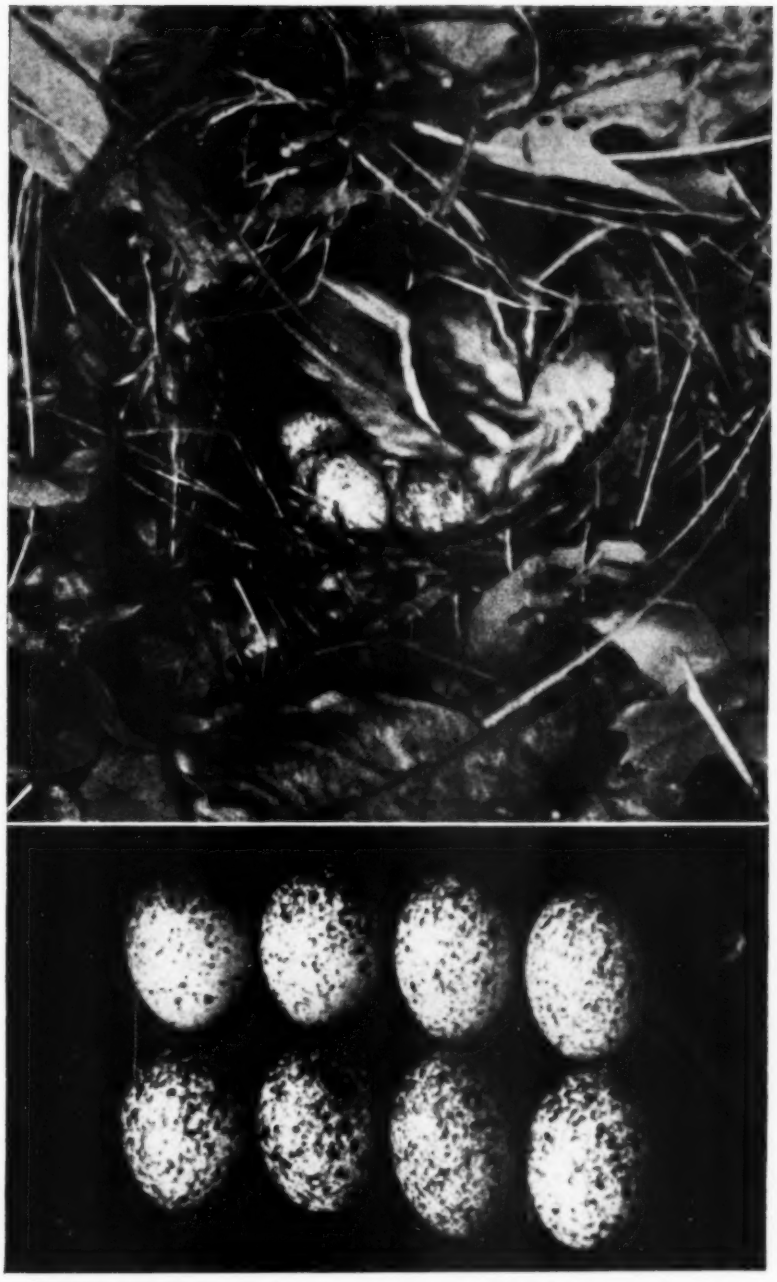

FIG. 1. Black and White Warbler incubating two eggs of her own and eight Cowbird eggs. Photographed in Washtenaw County, Michigan, May 30, 1949, by Haven H. Spencer.

FIG. 2. Eight Cowbird eggs from a Black and White Warbler nest. Photographed in Washtenaw County, Michigan, May 30, 1949, by Haven H. Spencer.

Dr. Sutton concluded, after examining the eggs, that possibly only 4 Cowbirds had parasitized this nest. Four female Cowbirds could have laid the 8 eggs in 2 days.

The situation at the nest remained unchanged during the observations on June 1 and June 3. On June 4, however, I discovered the 8 eggs destroyed and the Warbler departed, apparently due to predation by some carnivorous mammal.

Eight is apparently the greatest number of Cowbird eggs reported for any of the numerous host species of *Molothrus ater*. In a letter dated May 26, 1949, Dr. Herbert Friedmann informed me that 8 Cowbird eggs had once been reported for a Towhee nest, but that 5 was the most reported heretofore in a Black and White Warbler's nest. It is unfortunate that the commonness of parasitism of the Towhee did not come to my attention in time for me to determine the species of the 3 nestlings found near the Warbler's nest.

While this series of observations is of interest principally because of the number of Cowbirds' eggs in the Warbler's nest, it also furnishes a nesting record for a part of Michigan where the Black and White Warbler nests only infrequently; and, further, it shows an unusual perseverance by the female Warbler in incubating a remarkable number of eggs for almost twice the duration of the normal incubation time.—GEORGE W. BYERS, *University of Michigan Museum of Zoology, Ann Arbor.*

**Red-wings feeding on white ash.**—Robert Nero's recent note under this heading (1950. *Wilson Bulletin*, 62: 39–40) reminds me of my own observations of this habit of the Red-wing (*Agelaius phoeniceus*). Every October beginning with that of 1922 this species has fed on the seeds of a large white ash (*Fraxinus americanus*) behind my house in West Roxbury, Massachusetts. My first note of this behavior, dated October 22, 1922, reads as follows: "A small flock composed of both sexes feeding in the top of our white ash. After reaching up and picking off a samara the bird held it against the twig on which it perched and evidently detached the wing, or perhaps shelled the seed, in this way. They seemed to require a solid twig to aid them in the shucking process and not to be able to cut the wing off with the bill alone as some of the finches do."

In some Octobers I have seen only male Red-wings feeding on ash seeds; in others, both sexes. My notes for October 26, 1947: "Many females among the Red-wings here today feeding in the ash trees and resting in hemlocks, etc. The females were in preponderance and flew about together." On at least one occasion (October 16, 1928) I have seen Rusty Blackbirds (*Euphagus carolinus*) similarly feeding on the ash seeds.—FRANCIS H. ALLEN, *215 La Grange St., West Roxbury 32, Massachusetts.*

**Unusual bathing techniques employed by birds.**—Near my home in Streetsville, Ontario, I have observed three species of birds bathing in unusual ways:

Black-capped Chickadee, *Parus atricapillus*. On February 26, 1946, I watched a chickadee bathing in new, light fluffy snow under a wide-spreading shrub. It dived in and fluttered and floundered along with bathing motions of head-dipping and wing-quivering.

Tennessee Warbler, *Vermivora peregrina*. On September 30, 1949, a Tennessee Warbler bathed at a pond's shallow edge by flying down into the water from an over-hanging willow branch. It dipped in and out several times until thoroughly wet.

Slate-colored Junco, *Junco hyemalis*. On October 10, 1949, a junco took an early morning bath in dewdrops. There had been fog in the night, and everything was heavily bedewed, including a patch of thick clover in the lawn. Here the junco burrowed in under the wet leafage making the customary bathing motions of the wings, and sending the spray flying.—MARGARET H. MITCHELL, *Streetsville, R. R. 1, Ontario, Canada.*

# EDITORIAL

Members of the Club who attended the meeting at Jackson's Mill, West Virginia in April will never forget the wonderful spirit which prevailed. Maurice Brooks and the host organizations did a masterful job of entertaining and caring for us. We were especially glad to see Harvey I. Fisher, Editor of *The Auk;* William C. Legg, erstwhile Editor of *Field Ornithology;* and John Handlan, whose story-telling was a memorable part of one of the evening gatherings. We were sorry that our two living founders, Lynds Jones and R. M. Strong, could not be there. An unexpected feature was the informal showing of bird drawings by Hugh Land, of Huntington, West Virginia, Donald Malick, of Olean, New York, and Robert Verity Clem, of Hamden, Connecticut. The papers were well worth hearing. For a time Southgate Hoyt's famous pet, Phloeo, stole the show, but for those who preferred wild Pileated Woodpeckers, the West Virginia hills had provided a pair with their nest not far away. Secretary Harold Mayfield's detailed account of the meeting appears in the final pages of this issue.

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We are saddened by news of the death, on May 5, 1950, of H. Boardman Conover, for many years Research Associate of the Chicago Natural History Museum; world authority on game birds; and, with Charles B. Cory and Charles E. Hellmayr, author of the celebrated "Catalogue of Birds of the Americas and the Adjacent Islands." His private collection of game birds numbered nearly 18,000 specimens. Born in Chicago, on January 19, 1892, and educated at Yale, he was interested in birds all his life. Field studies took him to Venezuela in 1920, to Chile and Argentina in 1922, to Hooper Bay, Alaska in 1924, and to East Africa in 1926–27. He published about 38 papers, among them reports on his trips to Venezuela and Alaska. He became a member of the Wilson Ornithological Club in 1944, and a Life Member in 1947. Two of his papers, revisions of certain tinamous, remain to be published. His bird collection was willed to the Chicago Natural History Museum.

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Edward L. Chalif, of Short Hills, New Jersey, announces his intention of donating two hundred dollars a year for ornithological work in Mexico. Mr. Chalif has visited Mexico himself and has become deeply interested in the birds of that country. The Edward L. Chalif Grant for Bird Work in Mexico will be awarded through the Research Committee of the Wilson Ornithological Club.

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Miss Theodora Melone, of Minneapolis, Minnesota, who was active as a member of the Club's erstwhile Committee on Aid to European Ornithologists, has given twenty-five dollars to the Louis Agassiz Fuertes Grants Fund. In her letter of transmittal she says: "The extra 25 dollars is for the Fuertes Fund. It is not much, but it may help finance a research project."

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President Brooks has appointed the following:

*Trustee,* to serve three-year term, 1950-1953 ..... Aaron Moore Bagg

*Endowment Fund Committee:* Leonard C. Brecher, Chairman. Clinton S. Banks, Robert L. Edwards, Robert T. Gammell.

*Louis Agassiz Fuertes Research Grant Committee:* Charles G. Sibley, Chairman. John T. Emlen, Jr., Ernst Mayr, Frank A. Pitelka, George M. Sutton, Dwain W. Warner.

*Membership Committee:* Seth H. Low, Chairman. Ralph M. Edeburn, Assistant Chairman. Members to be announced later.

*Library Committee:* George J. Wallace, Chairman. H. Lewis Batts, Jr., Mrs. Herbert E. Carnes, A. W. Schorger, A. E. Staebler, Dwain W. Warner.

*Illustrations Committee:* Robert M. Mengel, Chairman. Allan D. Cruickshank, Hal H. Harrison, Karl H. Maslowski, Edgar M. Reilly, Jr., Robert W. Storer.

*Wildlife Conservation Committee:* Robert A. McCabe, Chairman. Members to be announced later.

*Committee on Arrangements for the 1951 meeting in Davenport, Iowa:* Fred T. Hall, Chairman. Members to be announced later.

*Representative on the Council of the American Ornithologists' Union*..... Burt L. Monroe

*Representative on the Council of the American Association for the Advancement of Science*..... S. Charles Kendeigh

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The editors are grateful to the following for assistance in preparing for publication the material presented in this issue of *The Wilson Bulletin:* William L. Brudon, Thomas D. Burleigh, Betty Darling Cottrille, David E. Davis, Eugene Eisenmann, Merle L. Kuns, Robert M. Mengel, Hustace Poor, Kenneth W. Prescott, Austin L. Rand, and Robert W. Storer. They are especially grateful to Elsa Hertz for the many hours she spent in re-typing manuscripts.

## ORNITHOLOGICAL LITERATURE

LISTA DE LAS AVES DE VENEZUELA CON SU DISTRIBUCION. Parte 2. Passeriformes. By William H. Phelps and William H. Phelps, Jr. Bulletin of the Venezuelan Society of Natural Sciences, Vol. 12, No. 75, 1950: $6\frac{3}{8} \times 9\frac{1}{4}$ in., 427 pp., with large folded map indicating the more than 350 localities mentioned. Paper. *Bs.* 10. Obtainable from La Sociedad Venezolana de Ciencias Naturales, Avenida Carabobo, Caracas, Venezuela. Send $3.00 in personal check on a U. S. bank, or an international money order.

Ornithologists interested in the taxonomy, nomenclature and distribution of Venezuelan birds have not, up to the present, had a definitive work for reference. Adolf Ernst's "Catálogo sistemático de las especies de aves que han sido observadas hasta ahora en los Estados Unidos de Venezuela," listing 315 genera and 556 species, and published in 1877, has not been easily obtainable. Such general works as "The Birds of South America," by Brabourne and Chubb, and the Chicago (Field) Museum of Natural History's "Catalogue of Birds of the Americas and the Adjacent Islands," begun in 1918 by Charles B. Cory and continued by Charles E. Hellmayr and Boardman Conover, have of course been useful, but the Venezuelan material has not been readily separable from the rest. Two papers in English, one by Alexander Wetmore (1939), "Observations on the Birds of Northern Venezuela," the other by Herbert Friedmann and Foster D. Smith, Jr. (1950), "A Contribution to the Ornithology of Northeastern Venezuela" (respectively Nos. 3073 and 3268, *Proc. U. S. Natl. Mus.* 87: 173–260 and 100: 411–538), have served to focus attention upon Venezuela, but they have not dealt with the country as a whole. In addition there have been, within the past decade or so, numerous reports in Spanish, among them "Aves de la Ribera Colombiana del Río Negro (Frontera de Colombia y Venezuela), " by Armando Dugand and William H. Phelps (1948. *Caldasia*, 5: 225–245), and "Las Aves de Perija," by William H. Phelps (1944. *Bol. Soc. Venez. Ciencias Naturales*, 56, pp. 265–338). Briefer papers, principally descriptions of new forms or annotated lists dealing with circumscribed areas such as islands off the north coast of Venezuela, have continued to appear both in English and in Spanish. Through this considerable mass of material everyone has come to realize that the Venezuelan Society of Natural Sciences, and especially William H. Phelps and his son, William H. Phelps, Jr., have been diligent in their study of Venezuelan birds.

"Lista de las Aves de Venezuela con su Distribución" is the culmination of all this effort. It represents numerous expeditions to little known parts of the country, preservation and identification of large numbers of specimens, visits to all the major museums of North America, correspondence with European ornithologists, and exhaustive study of the literature. Part 2, now before us, is admirably thoroughgoing and thoughtfully presented. As the title indicates,

this part deals only with passerine birds. Part 1, covering the non-passerines, is to appear later. For each form discussed the scientific name, Spanish vernacular name, and full reference to the original description are given. A synonymy is included only when the type localities involved are Venezuelan. Statements of range are primarily geographical, though mention of zones and elevations hints of ecology. For forms which also inhabit other countries or parts of countries, brief over-all range-statements are given. Of special value is the listing in boldface type of localities represented by specimens in the Phelps Collection.

For many North American readers, the introduction will be of special interest and value. Here are listed, in tabular form, 56 species and subspecies which migrate to or through Venezuela, spending only part of the year there; 8 Colombian forms which are known to occur near the Venezuelan border and which therefore probably inhabit Venezuela also; 87 forms not previously reported from Venezuela; and 107 additional forms described as new from Venezuelan specimens in the Phelps Collection. The 56 migrants are preponderantly species and subspecies which breed in the United States and Canada, 44 of them being such familiar birds as the Kingbird (*Tyrannus tyrannus*), Purple Martin (*Progne subis*), Veery (*Hylocichla fuscescens*), Yellow-throated Vireo (*Vireo flavifrons*), Black and White Warbler (*Mniotilta varia*), Baltimore Oriole (*Icterus galbula*), Summer Tanager (*Piranga rubra*), and Rose-breasted Grosbeak (*Pheucticus ludovicianus*), to name one species from each family represented. The Scarlet Tanager (*Piranga olivacea*), surprisingly enough, is missing from the list. It has never been recorded in Venezuela. The Fork-tailed Flycatcher (*Muscivora tyrannus*), which ranges, according to the A.O.U. Check-List (p. 203) from southern Mexico to Patagonia, breeds locally in Venezuela in the tropical zone.

An important table shows that 25 passerine families, 317 passerine genera, and 689 passerine species of birds are known to inhabit Venezuela. Of these not one genus is exclusively Venezuelan, but 31 species are. This is not the place for a lengthy discussion, or even a listing, of these species, of course, but it is interesting to note (a) that they represent only eight families—the Furnariidae or Ovenbirds, the Formicariidae or Ant-Shrikes, the Cotingidae or Cotingas, the Tyrannidae or Tyrant Flycatchers, the Coerebidae or Honey Creepers, the Parulidae or Wood Warblers, the Thraupidae or Tanagers, and the Fringillidae or Finches; and (b) that only one of these eight families, the Fringillidae, is common to the New World and the Old. Considering how sedentary many wrens are, it is a little surprising that Venezuela has no endemic troglodytid. The same might be said for other families as well. If, as recent investigations indicate, the Honey Creepers actually belong to the Parulidae, then Venezuela, with its seven endemic Wood Warblers (three of the genus *Diglossa*, 3 of the genus *Myioborus*, and 1 of the genus *Basileuterus*) must be considered a speciation center for that highly interesting family.

The carefully prepared index and the map with its accompanying list of place-names are invaluable. The printing, unfortunately, is not all that could be wished for. Proof has obviously been read with great care, but some words on almost every page, especially italicized words, are hard to read because of the poor type.—George Miksch Sutton.

FAIR ISLE BIRD OBSERVATORY FIRST ANNUAL REPORT 1949. George Waterston and Sons, Ltd., Printers, Edinburgh, Scotland, 1949: 5½ × 8½ in., 31 pp., 19 photos, 1 map on back cover. Paper. 2*s* 6*d*.

On June 1, 1948, Mr. Kenneth Williamson made his first visit to Fair Isle, located midway between the Orkney and Shetland Islands, in order to organize and direct the work of a bird observatory. The two-fold objective was to obtain data on the migration and the breeding behaviour of birds. The energy and enthusiasm of Mr. Williamson have produced remarkable results during the short span of this endeavor. Four abandoned Royal Navy Detachment huts were reconditioned for living quarters and a laboratory and bird traps were erected during the

first winter. The first observations on migration were commenced on April 14, 1949. A reading of the brief statement of the aims of the Fair Isle Bird Observatory does not prepare one for the wealth of information to be found in this excellent progress report. "The purpose of the Bird Observatory is to provide facilities for visitors to carry out scientific research on the island, not only in the sphere of ornithology, but in every aspect of Natural History."

One is impressed not only by the data on migration already obtained, but also by the scope of the projects planned for the future. The highlights of both spring and fall migration in 1949 are presented, including several noteworthy records. For example, an influx of Snipe (*Capella gallinago*), Redshanks (*Tringa erythropus*), and Redwings (*Turdus musicus*) was noted on the night of October 20–21. An analysis of trapped Redwings showed them to be of the Iceland race, *T. m. coburni* Sharpe. The first large scale invasion since 1935 of the Northern Great Spotted Woodpecker (*Dendrocopos major major*) occurred in September and October. All were birds of the year. In the first full season's work, six new species were added to the Fair Isle bird list, bringing the total to 298 forms. The six additions were: Black-browed Albatross (*Diomedea melanophrys*), Kentish Plover (*Charadrius alexandrinus*), Spotted Crake (*Porzana porzana*), Nightingale (*Luscinia megarhyncha*), Greenish Warbler (*Phylloscopus trochiloides viridanus*), and Pallas's Grasshopper-Warbler (*Locustella certhiola*).

A section on the "Behaviour of Migrants" discusses briefly certain open-country species and the Great Spotted Woodpecker. An insight into the adaptive ability of birds in unusual habitats is given in a discussion of these woodpeckers. "In the absence of trees, they hammered vigorously at the telephone poles, clothes-posts and the long lines of fencing-posts, feeding in characteristic fashion." Two birds were found in a dying condition with no recognizable food-remains in their gizzards. At least two birds, however, were still present in December and were "spending most of their time in the stack-yards where the traditional hammering action of the bill has been adapted to the task of removing the grain from its husk."

The laboratory routine for trapped birds includes weighing, plumage studies and the collection of external parasites. The weights of over 300 Rock Pipits (*Anthus spinoletta petrosus*) taken at various hours of the day from late June to November indicate a probable sexual difference in weight. "Wing-length provides an indication of sex in this species, and it has been found that those with wings over 90 mm. long are, on the average, 3 g. heavier than those with wings under 88 mm." It was found, also, that Redwings averaged 22.3 g. lighter in weight during the fall migration than in the spring migration. A careful check of trapped birds has added information on external parasites. A new tick for Britain, *Hyalomma marginatum balcanicum*, was taken from a Rose-colored Pastor (*Pastor roseus*), and two new hosts for hippoboscid flies were discovered: (1) *Ornithomyia avicularia* from a Water Rail (*Rallus aquaticus*), and (2) *O. fringillina* from a young Arctic Skua or Parasitic Jaeger (*Stercorarius parasiticus*). In hope of making precise descriptions of color differences between populations of the same species, a Lovibond-Schofield colorimeter is to be installed. If successful, the use of such an instrument will give a numerical reading for fine gradations in plumage-tints.

An enlightening section is presented on the recognition of 'rarities.' The philosophy at the Observatory concerning stragglers and accidentals differs strikingly from that of many ornithological circles: e.g., the rare warblers were not collected. In denying the necessity for such collecting at a modern field-study station, Mr. Williamson states: "It may be less satisfactory that an important record should rest on the deposition of a few observers, but against this must be set the important gain that these few observers are presented with a unique opportunity in field-work. They enjoy a few hours intensive training as a team,—hours which call for patient concentration on the job of observing and noting down details of plumage, habits and behaviour, and of analysing these for the all-important 'field-characters' (often so imperfectly known) likely to assist other observers in years to come." Photographs revealing details of wing-formula (e.g., of the Greenish Warbler, pl. 13) and other diagnostic characters were taken as permanent records of occurrence.

A progress report is given on long term studies on the breeding birds of the island, with special reference to the Arctic Skua, Great Skua (*Catharacta skua*), and Oyster-catcher (*Haematopus ostralegus*). The types of traps used and the success of each are discussed. A summary of the 1,793 birds ringed [banded] in 1949 and the fall of 1948 is included. The report is well illustrated with photographs of the island, traps and techniques employed.

The report admirably illustrates the results obtainable from concerted effort in ornithological studies. It should be a stimulus to all groups interested in the manifold problems of bird migration. Visitors are welcome at the station and accommodations are available for ten observers. Further information may be obtained by writing the Director, Fair Isle Bird Observatory Trust, 17 India Street, Edinburgh, Scotland.—Andrew J. Berger.

NORTH AMERICAN WATERFOWL. By Albert M. Day. Stackpole and Heck, Inc., New York and Harrisburg, 1949: xx + 329 pp., 68 half-tones, 55 pen and ink cuts, 1 color plate. $4.75.

This book aims to solicit the wildfowler's help and interest through simple, patient explanation of the problems at hand and of the work that is being done to manage waterfowl as a harvestable resource. The book opens with a discussion of the reckless wildfowling of the past, then describes the steps taken to stem this heavy kill through protective legislation. This part of the story has been told many times over, of course; but here it is used as the required introduction to the main theme of the book: the modern program for the management of waterfowl. The precepts upon which the modern management program operates are set forth. Detailed discussions are given of the work of the law enforcement groups, the sanctuaries, the refuge program, the plan for waterfowl research, and the Pittman-Robertson program. There is a chapter on *State Activities* which we wish could have gone into more detail regarding the growing interest of the various states in the waterfowl program. The old attitude that responsibility for waterfowl management rests mainly with the federal government is gradually giving way to the modern plan wherein state and federal offices more equally share work and interest. There is one chapter on *Waterfowl Conservation in Canada*, mostly a brief historical record; and another chapter discusses *The Mexican Waterfowl Situation*, dealing at some length with first-hand observations of wildfowling in that country.

As with all "popular" books, the specialist sometimes does not have to read deeply to find a point or two he feels he might contest—not on accuracy but on the point of some incompleteness of treatment. I was disappointed in the chapter on wildlife research because it did not record some of the most important items that are now being studied. But I cast aside all doubts of the author's grasp on this topic when I came upon several sentences which are among the most important in the book. Mr. Day recognized the lag in wildlife research when he said (p. 203): "We have been slower in developing scientific techniques for the proper utilization and protection of our natural resources than we have in industrial fields." And he gives a solemn commitment for the future program when he writes: "Wildlife research must be a continuing function because conditions are ever changing as the pattern of land and water uses are altered. Answers obtained 20 years ago may not suit present-day needs" (p. 213). Those who have followed the work of the Fish and Wildlife Service during the last four years know of the great advancement in the Service's research program, particularly in the approach to waterfowl problems; and there is ample witness to the fact that the so-called "basic concept" of the 1930's is valued only as it measures up to modern observations.

The book is attractive in make-up and its value to many readers will be greatly increased by the many lively pen and ink drawings by Bob Hines. Among the many half-tones illustrating the work of the waterfowl program, there are included reproductions of all of the duck stamps since the first issue.—Albert Hochbaum.

BOOKS: List 8

Books added to the Wilson Ornithological Club Library since the publication of List 7. Lists 1 to 7 were published in the September issues of *The Wilson Bulletin*, 1943 to 1949.

Armstrong, Edward A., Bird life. 1949.

Beebe, William, Pheasant jungles. 1927.

Blanchan, Neltje, Bird neighbors. 1904.

Broun, Maurice, Hawks aloft: The story of Hawk Mountain. 1949.

Bullough, W. S., The reproductive cycles of the British and the Continental races of the Starling (*Sturnus vulgaris* L.). 1942.

Cruickshank, Allan D., Birds around New York City. 1942.

Cutright, Paul Russell, The great naturalists explore South America. 1940.

Darling, F. Fraser, Bird flocks and the breeding cycle. 1938.

David, Abbé, Abbé David's diary (translated and edited by Helen M. Fox). 1949.

Delamain, Jacques, Pourquoi les oiseaux chantent. 1928.

Forbush, Edward Howe, and John Bichard May, Natural history of the birds of eastern and central North America. 1939.

Fowler, W. Warde, Tales of the birds. 1888.

Groser, Horace G., The book of birds. 1911.

Haverschmidt, Fr., The life of the White Stork. 1949.

Hewitt, Redginal, Bird malaria. 1940.

Hoffman, Ralph, Birds of the Pacific states. 1927.

Howard, Eliot, A Waterhen's worlds. 1940.

Kirkman, F. B., Bird behaviour: A contribution based chiefly on a study of the Black-headed Gull. 1937.

Kortright, Francis H., The ducks, geese and swans of North America. 1942.

Musgrove, Jack W., and Mary R. Musgrove, Waterfowl in Iowa. 1943.

Nesbit, William, How to hunt with the camera. 1926.

Noll, Hans, Schweizer Vogelleben. 1942.

Nuttall, Thomas, A manual of the ornithology of the United States and of Canada. The water birds. 1834.

Palmer, Ralph S., A behavior study of the Common Tern (*Sterna hirundo hirundo* L.). 1941.

Phelps, William H., and William H. Phelps, Jr., Lista de las aves de Venezuela con su distribución. Parte 2, Passeriformes. 1950.

Roberts, Brian, The breeding behaviour of penguins, with special reference to *Pygoscelis papua* (Forster). 1940.

Roberts, Brian, The life cycle of Wilson's Petrel *Oceanites oceanicus* (Kuhl). 1940.

Rorimer, Irene T., A field key to our common birds. 1940.

Ryves, B. H., Bird life in Cornwall. 1948.

Sandars, Edmund, A bird book for the pocket. 1927.

Sanden, Walter von, Guja: Leben am See der Vögel. 1933.

Seeley, H. G., Dragons of the air, an account of extinct flying reptiles. 1901.

Selous, Edmund, Evolution of habit in birds. 1933.

Squire, Lorene, Wildfowling with a camera. 1938.

Stanford, J. K., The awl-birds. 1949.

Walkinshaw, Lawrence H., The Sandhill Cranes. 1949.

# PROCEEDINGS OF THE THIRTY-FIRST ANNUAL MEETING

BY HAROLD MAYFIELD, SECRETARY

The Thirty-first Annual Meeting of the Wilson Ornithological Club was held on Friday and Saturday, April 28 and 29, 1950, at the State 4-H Camp, Jackson's Mill, West Virginia. It was sponsored by the Brooks Bird Club and the Huntington Bird Study Club.

There were four half-day sessions devoted to papers and motion pictures, two general business meetings, and a meeting of the Executive Council. In addition to the official sessions of the Wilson Ornithological Club, there were other events: an informal reception following the Annual Dinner on Friday evening; a tour of the Camp grounds and an informal meeting on Saturday evening, featuring motion pictures, "Wild Flowers of the Alleghenies," by H. P. Sturm, and a lecture, "Who Killed Cock Robin?" by Dr. F. W. Preston; bird walks on Friday and Saturday mornings; and field trips to the Cheat-Gaudineer region and to Holly River State Park on Sunday, April 30. An exhibit of handmade articles, products of Southern Highlands craftsmen, was displayed.

This meeting will be long remembered for the beautiful setting in which it was held. The West Virginia hills were becoming green and the early spring flowers were in bloom. Perfect weather prevailed and every stroll across the Camp grounds was a field trip. Pileated and Red-bellied Woodpeckers were nesting near the meeting hall, and the songs of the Bachman's Sparrow and Carolina Wren were daily attractions.

## Meeting of the Executive Council

The meeting of the Executive Council was held in the lobby of Harrison Cottage, at 4:00 p.m., Thursday, April 27. The principal actions of the Council were as follows:

Upon invitation of the Davenport Public Museum, the Council voted to hold the Thirty-second Annual Meeting on Friday and Saturday, April 27 and 28, 1951, at Davenport, Iowa. A meeting of the Executive Council will be held on Thursday, April 26, and there will be field trips on Sunday, April 29.

David E. Davis asked to be relieved of the editorship of *The Wilson Bulletin*, but consented to continue in the post until a successor could be found. After a lengthy discussion of the matter, the Council voted that the resignation be accepted with regret.

George M. Sutton was elected Editor of *The Wilson Bulletin* beginning with the September, 1950, issue.

The Council recommended that abstracts of papers presented at annual meetings not be published henceforth in the Proceedings. The considerations in making this decision were as follows: The abstracts take up space which might better be used in publishing complete ornithological papers; the abstracts are usually not complete enough to warrant bibliographical reference; most of the papers of sufficient value are later published in full in *The Wilson Bulletin* or some other ornithological journal.

### Opening Ceremonies

Dr. C. T. Neff, Jr., Vice President of West Virginia University, opened the general meeting on April 28 with an address of welcome. Dr. Olin Sewall Pettingill, Jr., President of the Wilson Ornithological Club, responded for the organization.

### First Business Session

President Pettingill called to order the first business session on Friday morning. The minutes of the Thirtieth Annual Meeting, as published in *The Wilson Bulletin* for September, 1949, were approved.

The Treasurer's report was read, but action on it was deferred until after the report of the Auditing Committee at the final business session. The Treasurer's Report is published in the June, 1950, issue of the *Bulletin*.

#### *Report of Endowment Committee*

Leonard C. Brecher, Chairman, reported that six new life memberships were added during the year. A list of prospective life members is being compiled, and the committee will welcome the suggestions and help of all members. Life membership donations go into the endowment fund to provide steady income for the *Bulletin* and other activities of the club.

#### *Report of Research Committee*

John T. Emlen, Jr., reporting for Charles G. Sibley, Chairman, recommended that the Louis Agassiz Fuertes Research Grant of $100 be awarded to Arnold J. Petersen for a study, "Reproductive Cycle in the Bank Swallow." George M. Sutton announced that an extra $100 had been made available by an anonymous donor to this fund. This additional grant was divided as follows: $50 to Henry E. Childs, Jr., for "Population Dynamics and Life History of the Brown Towhee"; $25 to Harrison B. Tordoff for "Comparative Osteology of the Subfamilies of the Fringillidae"; and $25 to Byron E. Harrell for "Ecology of the Rancho Del Cielo, Tamaulipas, Mexico." There were nine applicants for grants.

#### *Report of Membership Committee*

Seth H. Low, Chairman, reported that the names of 229 prospective members enrolled since the 1949 meeting were posted for the inspection of members. These people were to come up for election to membership at the final business session. On April 30, 1950, the Club had 1543 members and 125 institutional subscriptions to the *Bulletin*.

#### *Report of Illustrations Committee*

Robert M. Mengel, Chairman, reported that this committee had consulted with the editor and had given him specific assistance as follows:

1. Advised the editor about numbering, sequence and quality of illustrations (1 paper).
2. Redrawn a number of graphs and maps (about 11 for 3 papers).
3. Provided a frontispiece in color for the March, 1950, issue of *The Wilson Bulletin*.
4. Assembled photographs for use in connection with one future paper.
5. In addition, the Chairman has reviewed two books, consisting largely of illustrative material, for *The Wilson Bulletin*.

#### *Report of Committee on Aid to European Ornithologists*

Miss Theodora G. Melone, reporting for Mrs. Frances Hamerstrom, Chairman, recommended that this committee not be reappointed for another year, in view of the fact that the condition of scientists in Europe has improved so much in the past year. Mrs. Hamerstrom,

who has just returned from a visit in Europe, has brought back a first-hand account of this situation. She tells of the great appreciation of the people in Europe who have received gift parcels. Through the combined efforts of several American societies, more than 3000 packages had gone to European ornithologists about a year ago and many more have gone since that time. As an evidence of his appreciation, one scientist donated a valuable collection of bird skins from eastern Europe and Asia to the Museum of Zoology, University of Michigan.

### *Temporary Committees*

The president appointed three temporary committees as follows:

*Auditing Committee*

Leonard Brecher, Chairman
Frederick V. Hebard

*Resolutions Committee*

James Tanner, Chairman
Aaron M. Bagg
Fred T. Hall

*Nominating Committee*

R. Allyn Moser, Chairman
A. W. Schorger
S. Charles Kendeigh

## Second Business Meeting

The second and final business meeting was called to order at 9:00 a.m., Saturday, April 29, by President Pettingill. All candidates for membership to the club were elected.

### *Report of Library Committee*

George J. Wallace, Chairman, reported that since the publication of the list in the March, 1949, *Bulletin* 61 books, 78 magazines and bulletins, 1104 reprints, and 6 pamphlets have been added to the library. The committee is assembling and re-listing all of the book titles that have been published in annual lists in September *Bulletins* from 1943 to 1949. It is hoped that these may be published all together in an early issue of the *Bulletin*, thus informing members about the books (not separates and journals) in the Club's library.

### *Report of Auditing Committee*

The Auditing Committee reported that the books of the Treasurer had been examined and found to be in good condition. Special commendation was expressed to Burt L. Monroe, retiring Treasurer, for the systematic methods and meticulous accuracy of his records.

### *Election of Officers*

A. W. Schorger, reporting for the Nominating Committee, proposed the following officers for 1950: President, Maurice Graham Brooks; First Vice President, Walter J. Breckenridge; Second Vice President, Burt L. Monroe; Secretary, Harold Mayfield; Treasurer, James H. Olsen; Elective members of Executive Council, Richard H. Pough (term expires 1951), W. C. Vaughan (term expires 1952), Fred T. Hall (term expires 1953).

The report of the Nominating Committee was accepted and the nominees were elected.

*Report of Resolutions Committee*

The Resolutions Committee presented the following resolutions, which were adopted:

1. RESOLVED, That the Committee on Arrangements for the 1950 Annual Meeting at Jackson's Mill be highly commended for the excellent and imaginative planning that made this meeting a thorough success.
2. RESOLVED, That the Wilson Ornithological Club express its gratitude to the following groups or individuals whose efforts and generosity have contributed to the success of this 1950 meeting: to the Brooks Bird Club and the Huntington Bird Study Club—sponsors of the meeting; to West Virginia University for the use of the 4-H Camp at Jackson's Mill; to Mr. C. H. Hartley, Director of the West Virginia 4-H Camp; and furthermore, that the chairman of the Committee on Arrangements be requested to forward this expression of gratitude to the individuals or appropriate officials.
3. RESOLVED, That the officers of the Wilson Ornithological Club and the members of the various committees be commended for their inspiring leadership and able efforts during the past year; and further, that the Club express its gratitude to three retiring officers for their unceasing and often unrecognized efforts on behalf of this organization—to the retiring President, Olin Sewall Pettingill, Jr.; to the retiring Editor, David E. Davis; and especially to the retiring Treasurer, Burt L. Monroe, for five arduous years of service.
4. RESOLVED, That the Wilson Ornithological Club express its gratitude to the members of the Committee for the Relief of European Ornithologists for the time and effort they have volunteered in such a good cause.
5. WHEREAS the Wilson Ornithological Club has in the past sponsored the establishment of an air-space reservation in the Wilderness Area of the Superior National Forest, and WHEREAS a Presidential Proclamation has been declared establishing such an air-space reservation to become effective at a later date; and
   WHEREAS the opponents of this reservation have been active in attempting to have this proclamation withdrawn; be it
   RESOLVED, that the Wilson Ornithological Club reaffirm its support of the establishment of this air-space reservation; furthermore be it
   RESOLVED, that the Secretary of this Club be directed to send a copy of this resolution to the President of the United States.

*Announcements*

Among the resolutions adopted at the 1949 meeting was one urging the designation of Cranberry Glades in West Virginia as a Natural Area. The United States Forest Service has taken this action.

Groups interested in serving as hosts to the Wilson Ornithological Club at the 1952 meeting should write to the Secretary before April, 1951.

## Annual Dinner

The Annual Dinner was held on Friday evening, April 28. Olin Sewall Pettingill, Jr., President of the Wilson Ornithological Club, served as toastmaster and gave the principal address.

## Field Trips

On Sunday morning, April 30, members and guests visited the Cheat-Gaudineer region in the high Alleghenies and Holly River State Park.

PAPERS SESSIONS

*Friday Morning, April 28*

1. Henri C. Seibert, Ohio University, *Observations on the Roosting Flight of Herons* (slides, 15 minutes)
2. A. O. Ramsay, McDonogh, Maryland, *Some Conditioned Responses in Crows* (slides, 10 minutes)
3. James T. Tanner, University of Tennessee, *Black-capped and Carolina Chickadees in the Great Smoky Mountains* (slides, 15 minutes)
4. Oliver S. Owen, Cornell University, *The Vertical Zonation of Song-Perches in a Central New York Woodlot* (slides, 10 minutes)
5. James H. Jenkins, University of Georgia and Georgia State Game and Fish Commission, *A Comparison of the Food Habits of the Barn Owl in the Piedmont and Lower Coastal Plain of Georgia* (slides, 15 minutes)
6. Emerson Kemsies, University of Cincinnati, *Summary of the Changes in Ohio Bird Life Since the Publication of Lynds Jones' Catalog of Ohio Birds in 1903* (15 minutes)
7. W. J. Breckenridge, University of Minnesota, *Activities of Wintering Goldeneyes* (slides, 10 minutes)

*Friday Afternoon, April 28*

8. Maurice Brooks, West Virginia University, *The Unglaciated Appalachian Highland: The Region and its Characteristics* (15 minutes)
9. J. J. Murray, Lexington, Virginia, *Biotic Zonation in the Southern Appalachians* (15 minutes)
10. Eugene P. Odum, University of Georgia, *Distribution and Population Density of Birds at the Southern End of the Appalachians* (slides, 15 minutes)
11. Arthur Stupka, Gatlinburg, Tennessee, *Notes on Some Breeding Birds of the Great Smoky Mountains National Park* (15 minutes)
12. Frederick V. Hebard, Philadelphia, Pennsylvania, *The St. Mary's, Georgia, Region Seventy Years After Brewster* (motion picture, 30 minutes)
13. John T. Emlen and Robert Nero, University of Wisconsin, *Experimental Studies on Territory Relationships in the Red-winged Blackbird* (slides, 15 minutes)
14. Aretas A. Saunders, Norwalk, Connecticut, *Song in Relation to Subspecies* (15 minutes)
15. R. Wayne Bailey and Hans G. Uhlig, Conservation Commission of West Virginia, Charleston and Elkins, West Virginia, *Factors Influencing the Distribution and Abundance of the Wild Turkey in West Virginia* (12 minutes)

*Saturday Morning, April 29*

16. Dale A. Zimmerman, University of Michigan, *First Impressions of the Birds of Jalisco, Mexico* (slides, 20 minutes)
17. David E. Davis, Johns Hopkins University, *The Growth of Starling Populations* (slides, 15 minutes)
18. Aaron Moore Bagg, Holyoke, Massachusetts, *Meterological Accompaniments of Goose Flights in the Midwest, October 20–26, 1949* (slides, 20 minutes)
19. Stephen W. Eaton, St. Bonaventure College, *A Comparative Study of the Genus* Seiurus (slides, 20 minutes)
20. Southgate Y. Hoyt, Cornell University, *The Feeding Technique of the Pileated Woodpecker* (slides, 15 minutes)
21. Harvey I. Fisher, University of Illinois, *East-West Distribution of Birds in the Hawaiian Archipelago* (slides, 15 minutes)
22. G. Ronald Austing and Worth Randle, University of Cincinnati, *A Report on Feeding Habits of Wintering Long-eared Owls and Saw-whet Owls in Southwestern Ohio* (15 minutes)

*Saturday Afternoon, April 29*

23. Hal H. Harrison, Tarentum, Pennsylvania, *Natural Color Portraits of Some West Virginia Birds* (slides, 30 minutes)
24. William L. Rhein and Edward S. Frey, Harrisburg, Pennsylvania and Lemoyne, Pennsylvania, *The Northern Raven in Pennsylvania* (motion picture, 40 minutes)
25. W. Bryant Tyrrell, Tacoma Park, Maryland, *Roseate Spoonbills* (motion picture, 40 minutes)
26. George M. Sutton, University of Michigan, *Bird Life of the Far North* (motion picture taken by Henry C. Kyllingstad, 45 minutes)

## ATTENDANCE

Three hundred twenty-one members and guests, representing 19 states of the United States and one province of Canada, registered at the meeting. Next to West Virginia, Michigan was the state with the largest attendance. The list of members and visitors follows:

From **Connecticut:** 7—Allison L. Kampf, *Bridgeport*; Richard A. Kampf, *Bridgeport*; Mr. and Mrs. Roy C. Kampf, *Bridgeport*; Roy C. Kampf, Jr., *Bridgeport*; Mr. and Mrs. Aretas A. Saunders, *Norwalk*.

From **Georgia:** 8—J. Fred Denton, *Augusta*; William W. Griffin, *Atlanta*; James H. Jenkins, *Athens*; David W. Johnston, *Athens*; Mrs. Charles Neal, *Demorest*; Bill Odum, *Athens*; Eugene P. Odum, *Athens*; Martha H. Odum, *Athens*.

From **Illinois:** 6—Amy G. Baldwin, *Chicago*; Karl E. Bartel, *Blue Island*; Leona Draheim, *Chicago*; Mr. and Mrs. H. I. Fisher, *Urbana*; Mrs. Ethel M. Henwood, *Urbana*.

From **Indiana:** 8—Mrs. Kenneth Campbell, *Indianapolis*; James B. Cope, *Richmond*; Mr. and Mrs. M. S. Markle, *Richmond*; Stephen W. Simon, *Richmond*; Mrs. C. S. Snow, *Richmond*; Margaret Umbach, *Fort Wayne*; J. Dan Webster, *Hanover*.

From **Iowa:** 4—C. C. Hazard, *Davenport*; Norwood C. Hazard, *Davenport*; Fred T. Hall, *Davenport*; Bud Johnson, *Davenport*.

From **Kentucky:** 8—Wm. H. Banks, Jr., *Louisville*; Leonard C. Brecher, *Louisville*; Nelson Leach, *Ashland*; Harvey B. Lovell, *Louisville*; Georga Martin, *Ashland*; Mr. and Mrs. Burt L. Monroe, *Anchorage*; Burt L. Monroe, Jr., *Anchorage*.

From **Maryland:** 23—Mr. and Mrs. Elting Arnold, *Chevy Chase*; Patricia Arnold, *Chevy Chase*; Sarah B. Arnold, *Chevy Chase*; Florence H. Burner, *Baltimore*; Orville W. Crowder, *Baltimore*; David E. Davis, *Baltimore*; Pearl Heap, *Baltimore*; Mrs. Alice S. Kaestner, *Baltimore*; Mrs. M. C. Kent, *Baltimore*; Seth H. Low, *Laurel*; William McHoul, *Baltimore*; Gilbert Miller, *Spring Gap*; Helen B. Miller, *Spring Gap*; Alfred O. Ramsay, *McDonogh*; Walter D. Ramsay, *McDonogh*; Miss T. M. Sandy, *Baltimore*; Mrs. H. P. Strack, *Baltimore*; R. Thomas Thayer, *Hagerstown*; Jane Tuttrup, *Derwood*; Mr. and Mrs. W. Bryant Tyrrell, *Tacoma Park*; W. D. Walker, Sr., *Kitzmiller*.

From **Massachusetts:** 1—Aaron M. Bagg, *Holyoke*.

From **Michigan:** 42—H. Lewis Batts, Jr., *Ann Arbor*; Hazel L. Bradley, *Jackson*; Mr. and Mrs. Edward M. Brigham, Jr., *Battle Creek*; Edward M. Brigham III, *Battle Creek*; Julie Brigham, *Battle Creek*; Robert D. Burns, *E. Lansing*; Mr. and Mrs. W. Powell Cottrille, *Jackson*; N. L. Cuthbert, *Mt. Pleasant*; Joyce Delaney, *Albion*; Clara Dixon, *Albion*; Jess Foote, *Albion*; John L. George, *Ann Arbor*; Charles O. Handley, Jr., *Ann Arbor*; G. Bryan Harry, *Ann Arbor*; Richard Hauke, *Ann Arbor*; Philip S. Humphrey, *Ann Arbor*; Dorothy Jackson, *Albion*; Bernard Johnson, *Albion*; Mrs. Reuben L. Kahn, *Ann Arbor*; Cecil C. Kersting, *Muskegon*; Agnes Kugel, *Grand Rapids*; Harry Laurie, *Albion*; Martha A. Lengemann, *Imlay City*; Mr. and Mrs. Robert M. Mengel, *Ann Arbor*; Mrs. Alice D. Miller, *Dearborn*; Mr. and Mrs. Walter P. Nickell, *Bloomfield Hills*; Philip G. Niemann, *Detroit*; William Oliver, *Mt. Pleasant*; Virginia Olmsted, *Plymouth*; Mrs. P. J. Reynolds, *Detroit*; Merle E. Stitt, *Ann*

*Arbor*; George M. Sutton, *Ann Arbor*; Harrison B. Tordoff, *Ann Arbor*; Elsie W. Townsend, *Detroit*; Mr. and Mrs. George J. Wallace, *E. Lansing*; Robert A. Whiting, *Jackson*; Dale A. Zimmerman, *Imlay City*.

From **Minnesota:** 8—Mr. and Mrs. W. J. Breckenridge, *Minneapolis*; Amy Chambers, *Minneapolis*; Mrs. Mary Lupient, *Minneapolis*; Theodora Melone, *Minneapolis*; Mr. and Mrs. Olin Sewall Pettingill, Jr., *Northfield*; Luther Rogers, *Northfield*.

From **New Jersey:** 6—Edward L. Chalif, *Short Hills*; Robert C. Conn, *Bound Brook*; Robert C. Frohling, *Union*; Peggy M. MacQueen, *Bergenfield*; Edward P. Manners, *Brooklawn*; Floyd P. Wolfarth, *Nutley*.

From **New York:** 15—Mr. and Mrs. Dean Amadon, *New York*; Frances L. Burnett, *Ithaca*; Marjorie Crimmings, *Ithaca*; Mr. and Mrs. Stephen W. Eaton, *St. Bonaventure*; Mr. and Mrs. J. Southgate Y. Hoyt, *Etna*; Mr. and Mrs. F. L. Jaques, *New York*; Donald Malick, *Olean*; Oliver S. Owen, *Ithaca*; Kenneth C. Parkes, *Ithaca*; James A. Walker, *Waterloo*; M. Shirley Windnagle, *Ithaca*.

From **Ohio:** 36—G. Ronald Austing, *Cincinnati*; Margaret Baker, *Salem*; William C. Baker, *Salem*; Mr. and Mrs. Clinton S. Banks, *Steubenville*; W. Hughes Barnes, *New Concord*; Edna Bowles, *Martins Ferry*; Mr. and Mrs. Keith Buchanan, *Amsterdam*; Robert C. Carder, *Pataskala*; Vera Carrothers, *E. Cleveland*; Mr. and Mrs. Don R. Eckelberry, *Chagrin Falls*; Elsie Erickson, *Cleveland*; Earl Farmer, *Steubenville*; Frank F. Ferris, *Youngstown*; Edith V. Folger, *Oxford*; Adela Gaede, *Cleveland*; Twila Hessin, *Nashport*; Lawrence Hicks, *Columbus*; Marion L. Hundley, *Sylvania*; Emerson Kemsies, *Greenhills*; Luella Literaty, *Lakewood*; H. B. McConnell, *Cadiz*; Harold Mayfield, *Toledo*; Mr. and Mrs. James H. Olsen, *Worthington*; Ralph E. Ramey, *Columbus*; Harry Roach, *Cincinnati*; Henri C. Seibert, *Athens*; Mildred Stewart, *Cleveland*; Mr. and Mrs. Albert R. Tenney, *Toronto*; Lois Lee Tenney, *Toronto*; John G. Worley, *Cadiz*; David Worley, *Cadiz*.

From **Ontario:** 4—J. Bruce Falls, *Toronto*; W. W. H. Gunn, *Toronto*; Mr. and Mrs. J. Murray Speirs, *Pickering*.

From **Pennsylvania:** 31—Dorothy Auerswald, *Pittsburgh*; Mal M. Crawford, *Brownsville*; Edward S. Frey, *Lemoyne*; George E. Grube, *Gettysburg*; Mr. and Mrs. Hal H. Harrison, *Tarentum*; Miss Mary Hartsough, *Pittsburgh*; Frederick V. Hebard, *Philadelphia*; Lou Hetrick, *Gettysburg*; Mr. and Mrs. J. J. Hommel, *Pittsburgh*; Walter T. Kohler, *Lemoyne*; James Manley, *New Kensington*; Mr. and Mrs. O. G. Masteller, *West Alexander*; Albert F. Meaden, Jr., *Gettysburg*; M. Graham Netting, *Pittsburgh*; Tony Netting, *Pittsburgh*; Mr. and Mrs. J. B. Paterson, *Pittsburgh*; Mr. and Mrs. F. W. Preston, *Butler*; C. Chandler Ross, *Philadelphia*; James B. Ross, *Pittsburgh*; Mr. and Mrs. Ward M. Sharp, *State College*; Phillip B. Street, *Philadelphia*; Mr. and Mrs. Merrill Wood, *State College*; Merrill Wood, Jr., *State College*; Emily C. Wood, *State College*.

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From **Virginia:** 7—John W. Aldrich, *Alexandria*; Florence Hague, *Sweet Briar*; Mr. and Mrs. D. Ralph Hostetter, *Harrisonburg*; Mr. and Mrs. J. J. Murray, *Lexington*; Frederic Scott, *Hampden-Sydney*.

From **Washington, D. C.:** 1—Katherine Keeley.

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### A WORD TO MEMBERS

*The Wilson Bulletin* is not as large as we want it to be. It will become larger as funds for publication increase. The Club loses money, and the size of the *Bulletin* is cut down accordingly, each time a member fails to pay dues and is put on the 'suspended list.' Postage is used in notifying the publisher of this suspension. More postage is used in notifying the member and urging him to pay his dues. When he does finally pay he must be reinstated on the mailing list and there is a publisher's charge for this service. The *Bulletin* will become larger if members will make a point of paying their dues promptly.

### NOTICE OF CHANGE OF ADDRESS

If your address changes, notify the Club immediately. Send your complete new address to the Treasurer, James H. Olsen, Post Office Box 151, Worthington, Ohio. He in turn will notify the publisher and editor.

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## THIRTY SECOND ANNUAL MEETING
## DAVENPORT, IOWA, APRIL 27–28, 1951

*Complete Details in December 1950 Bulletin*